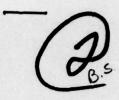


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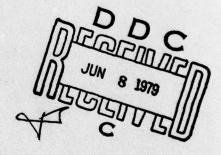
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TRASANA
TECHNICAL REPORT NO. 3-78

FLIGHT PROFILE PERFORMANCE HANDBOOK

VOLUME VIIB - CH-47B (CHINOOK)



**APRIL 1979** 

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DEPARTMENT OF THE ARMY
US ARMY TRADOC SYSTEMS ANALYSIS ACTIVITY
WHITE SANDS MISSILE RANGE
NEW MEXICO 88002

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The findings in this report are not to be construed as an official Department of the Army position.

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Information and data contained in this document are based on the input available at the time of preparation. The results may be subject to change and should not be construed as representing TRADOC position unless so specified.

DEPARTMENT OF THE ARMY
US ARMY TRADOC SYSTEMS ANALYSIS ACTIVITY
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TRASANA
TECHNICAL REPORT, NO. 3-78

FLIGHT PROFILE PERFORMANCE HANDBOOK.

VOLUME VIIB & CH-47B (CHINOOK)

Nathan H./Cleek, Jr. Alan J. Wolfe

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PAPRIL 1979

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DEPARTMENT OF THE ARMY
US ARMY TRADOC SYSTEMS ANALYSIS ACTIVITY
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NEW MEXICO 88002

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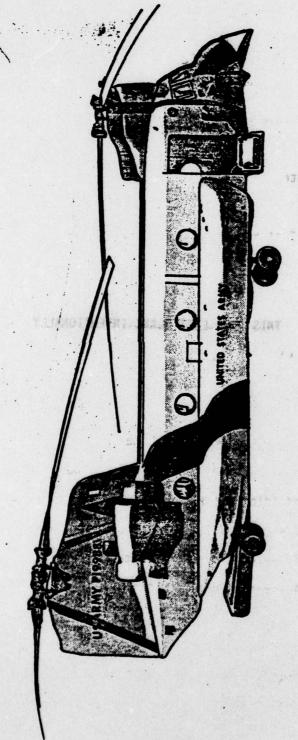
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#### PURPOSE

The purpose for preparing this handbook series is fourfold: (a) to validate CHINOOK performance data quickly, (b) to reduce the manpower and time to prepare accurate flight profiles, (c) to standardize performance data so that the analysis community can benefit from a single reference in conducting studies and (d) to provide a handbook that can be used for training in the mission profile planning area.

#### 2. BACKGROUND

The CHINOOK performance data contained in this Flight Profile Performance Handbook (FPPH) series was originally acquired as a data base for the Aircraft Mission Processing Simulation (AMPS) model. AMPS is a computer program developed by the Aviation Systems Analysis Branch of the US Army TRADOC Systems Analysis Activity (TRASANA) to support Cost and Operational Effectiveness Analyses (COEAs). AMPS generates detailed flight profiles for a wide variety of helicopter missions. The data was provided TRASANA by the Army Aviation Research and Development Command (AVRADCOM) and was the most accurate data available to AVRADCOM at the time of handbook publication. In structuring the data base for AMPS it was noted that the data, when properly organized, could provide a method of doing quick and simple flight profile simulations. This volume presents the CHINOOK data and explains how it can be used.

#### 3. OBJECTIVES OF THE HANDBOOK

- a. Data Validation. This volume of the handbook contains tables with the precise performance data and format required to develop flight profiles for computer simulations. Using the handbooks as a reference, the individual project manager (PM) will be able to quickly validate or update as required all associated data contained in the different tables. If this procedure is followed by the various PMs, support of Helicopter COEAs and other analyses can be efficiently implemented.
- b. Flight Profile Development. Much of the manpower and time spent in preparing flight profiles for supporting aircraft COEAs is dedicated to look-up, correlation and validation of performance data. Once the procedure contained in this handbook is implemented, flight profiles can be easily prepared. What normally took one man 4 to 5 days to prepare can now be prepared in 3 to 4 hours.

- Standardization of Performance Data. Each of the PMs has been contacted by AVRADCOM to validate the performance data contained in each handbook in this series. Once each handbook is published, the data contained will be kept current as of the publication date. Since the requests for current information are constantly being forwarded to the PMs by analysis groups, this handbook can be a reference and assure a commonality in studies within the community.
- d. Training for Planning Missions and Flight Profiles. For training purposes each handbook can stand alone. It is only a matter of following the example provided and applying the proper data to fit the flight profile desired. Although the example shown is simplistic, the methodology may be expanded to apply to any flight profile no matter how complex.

#### 4. OTHER VOLUMES

This handbook is one of a series that covers the helicopters in the US The complete set of handbooks and their subjects are: Army inventory.

Volume I - FPPH Description

- UH-60A (BLACKHAWK) Volume II

Volume III - AH-1G (COBRA)

- AH-1S (COBRA) Volume IV

- YAH-64 (Advanced Attack Helicopter [AAH]) Volume V ispro vitadorio dene senti eni

- OH-58C (KIOWA) Volume VI

Volume VII - CH-47 (CHINOOK)

Volume VIII - CH-54 (TARHE)

Volume IX - UH-1H (HUEY)

#### 5. GENERAL HANDBOCK DESCRIPTION

a. Performance Data. The data contained in these volumes is CHINOOK performance data compiled from the results of actual experiments. It is not engineering data and is not intended to serve as a base for future helicopter construction or acquisition. The more mature the helicopter becomes, the less likely there will be a change in the basic performance to look-up, correlation and walldation of seriorsance data, procedure contained in this handbook is implemented, flight pr

can now be propayed in 3 to 4 hours.

be easily prepared. What normally took one man a to 5 days to prepare

- b. Handbook Organization. This volume is one of a series of volumes as identified in paragraph 4 above. Volume I is a description of the methodology used to develop the tables for each of the other volumes. This volume and all other volumes except Volume I provides a simplified flight profile example in Chapter 2. Chapter 3 provides an explanation of each of the five types of data tables contained in the handbook. The five types of tables deal with: (1) Basic Fuel Flow Data, (2) Delta Fuel Flow for Drag Data, (3) Ground Idle Fuel Flow Data, (4) Gross Weight Limits Data and, (5) Velocity Limits data. Chapter 4 contains the actual tables to be used for developing flight profiles.
- c. Volume VII Organization. The US Army has four different versions of the CH-47 CHINOOK. Due to the large amount of data for these four versions and to allow for easier reference, there is a separate section of Volume VII for each. Volume VIIA contains data for the CH-47A. In the same manner, Volume VIIB contains CH-47B data, Volume VIIC contains CH-47C data, and Volume VIID contains CH-47D data.

#### 6. CH-47B OPERATION RATES

The CH-47B engine operates at two different rates which are dependent on the aircraft's gross weight. At gross weights of 37,000 lbs or less the engine runs at 225 RPM, above 37,000 lbs the rate is 230 RPM. Consequently, separate tables are provided in this volume for the different RPMs. The tables for 225 RPM are in Chapter 4 of this volume, while Chapter 5 contains the tables for 230 RPM.

#### CHAPTER 2

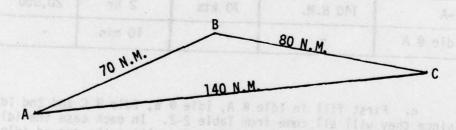
#### FLIGHT PROFILE EXAMPLE

#### 1. GENERAL

This chapter provides an example of how to develop a flight profile, albeit simple, that can be extended to cover any number of stops, loads and distances all depending on helicopter capability and fuel available.

#### 2. DISCUSSION

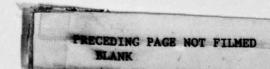
- a. The main question this example of a flight profile will answer is, "Do I have enough fuel to fly the proposed mission?"
- b. Suppose a pilot is to fly a simple resupply mission in a CH-47B CHINOOK helicopter that calls for flying (as shown in illustration 2-1) from point A (the air base), to point B (the pick up area) to point C (the drop off area) and return to A.



#### Illustration 2-1

c. The other information given is airspeed (AS) from A to B which is to be 70 knots (kts), from B to C 40 kts, and from C to A 70 kts. The CHINOOK helicopter is to be flown, at 4,000 ft for all legs at an ambient temperature of 15°C, and an idle altitude for take off, pick-up and drop off areas (ground level) of 2000 ft\*. The mission plan also shows 10 minutes idle at A before take off, 20 minutes idle at B while loading, 20 minutes idle at C while unloading and 10 minutes idle on return to A before shut down. The CHINOOK will be flown empty at a gross weight (GW) of 20,000 lbs from A to B and from C to A, while the cargo from B to C will be 12,000 lbs.

<sup>\*</sup>All altitudes are in reference to sea level.



d. The flight plan is prepared by drawing up a table similar to Table 2-1 below. By filling in the blanks under fuel, it can be determined if the total is too large for the helicopter.

#### TABLE 2-1

Helicopter: CHINOOK (CH-47B)

Altitude: 4000 ft flight/2000 ft idle

Temperature: 15°C

SIGSLIEVS Team

LEG	DISTANCE	AS	TIME	GW (1bs)	FUEL
Idle @ A	"Indiagning beg	10 Stembay Nation of the	10 min	Alam off	D FILL
A-BO A OLD	70 N.M.	70 kts	as al britis	20,000	
Idle @ B	do yo∔d auti a	2 (011) 10 70100, 63	20 min	Potgosilan 3	000141
B-C	80 N.M.	40 kts	2 hr	32,000	M(1) 5
Idle @ C		-	20 min		1
C-A	140 N.M.	70 kts	2 hr	20,000	
Idle @ A	W × 108		10 min	•	

e. First fill in Idle @ A, Idle @ B, Idle @ C and 2nd Idle @ A since they will all come from Table 2-2. In each case the idle is at 2000 ft and a temperature of 15°C. Consulting the ground idle fuel shown in Table 2-2, the value of 1124 lbs/hr is at the intersection of 2000 ft and 15°C.

1st Idle @ A = 1/6 X 1124 = 187 1bs

Idle  $\theta$  B = 1/3 X 1124 = 375 lbs

Idle  $0 C = 1/3 \times 1124 = 375 \text{ lbs}$ 

2nd Idle 0 A = 1/6 X 1124 = 187 lbs

serio 200, Si ed 1114 3 od 8 mort opres

TABLE 2-2

GROUND IDLE FUEL FLOW AIRCRAFT - CH-47b

CHINOUK

SEA LEVEL 2000 +000 6000 8000 10000	C 1220 1164 1072 1000 932 800	C 1200 1144 1052 980 912 840	C 1160 1124 1032 960 892 820	CT 1140 1100 1111 1112
	-25 C	-5 C	15 C	35 C

ENTRIES ARE AIRCRAFT FUEL FLOW RATES IN LUS/HK

**TABLE 2-3** 

\_

EUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUS/HR
PRESSURE: 4060 FT TEMPERATURE: 15 C
AIRCRAFT - CH-478 225 KPM
CHINOOK

GROSS	The state of the s			FLIG	HT. MOU	FLIGHT MODE (KIS)	A851		5	140
(LBS)	HIGE	HIGE HOGE	NOE	040	99	90	100	100 120	140	160
20.000	1549	1549 1673 1560	1566		1332	1336	1447 1332 1336 1436 1714	1714	2178 2768	278
24.000	1775	1775 1954	1790	1790 1645	1489	1467	1467 1549 1815 2268 2914	1815	2268	167
28,000	2008	2208	2024	2008 2208 2024 1841 1648 1610 1684 1931 2376 3010	1648	1610	1684	1931	2376	301
32,000	2249	2521	2291	2249 2521 2291 2060 1832 1769 1836 2070 2511 31U/	1832	1769	1836	2070	2511	310
36,000	2530	2802	258g	2530 2862 2588 2313 2032 1946 2006 2229 2673 3312	2032	1946	2006	2229	2673	531
37,000	2603	2925	2668	2603 2955 2668 2282 2084 1992 2653 273 2791 3391	2084	1997	2053	27.73	1979	339

Notice the conversion from minutes to hours. These values must be used because fuel flow is in lbs/hr.

- f. The fuel flow for the three legs of the mission are calculated next. The heading on Table 2-1 shows a need for the Basic Fuel Flow data chart for the CHINOOK helicopter flying at 4000 ft and at 15°C ambient temperature. Table 2-3 contains the necessary information.
- (1) Leg A-B is at 70 kts and 20,000 lbs. This is not one of the values given but 60 kts is 1332 lb/hr and 80 kts is 1336 lb/hr. Interpolation gives the value of 1334 lb/hr for a 70 kts airspeed. Since the leg is one hour long:

Leg A-B = 1 X 1334 = 1334 lbs

(2) Leg B-C is at 40 kts and 32,000 lbs. This value is in the table; 2060 lbs/hr. Since the leg is two hours long:

Leg B-C = 2 X 2060 = 4120 1bs

(3) Leg C-A is at 70 kts and 20,000 lbs. This fuel flow rate was computed above to be 1334 lbs/hr. Since the leg is two hours long:

Leg  $C-A = 2 \times 1334 = 2668 \text{ lbs.}$ 

g. The flight profile can be finished by filling in Table 2-1 as shown in Table 2-4.

#### TABLE 2-4

Helicopter: CHINOOK (CH-47B) Altitude: 4000 ft flight/2000 ft Idle Temperature: 15°C

LEG	DISTANCE	AS	TIME	GW (1bs)	FUEL
Idle @ A	•,		10 min	•	187 lbs
A-B	70 N.M.	70 kts	1 hr	20,000	1334 1bs
Idle @ B			20 min		375. lbs
B-C	80 N.M.	40 kts	2 hr	32,000	4120°.1bs
Idle @ C	•	<u> -</u>	20 min	•	375 lbs
C-A	140 N.M.	70 kts	2 hr	20,000	2668 1bs
Idle @ A		-	10 min	-	187 1bs
				Total	9246 1bs

- h. Although only two look-up tables were used for this example, each type of table has several conditions that are changed so that a wide band of performance parameters can be addressed. The discussion on each of the five types of tables is contained in Chapter 3. A succinct description of each of these five types of tables is:
- (1) Basic Fuel Flow Data: Gives the rate the aircraft uses fuel dependent on the given flight conditions.
- (2) Delta Fuel Flow for Drag Data: Gives the additional rate of fuel flow to be added to the basic rate for external drag.
- (3) Ground Idle Fuel Flow Data: Gives the rate fuel is used when the aircraft is on the ground with its engine running.
- (4) Gross Weight Limits Data: A check on whether or not the aircraft has enough lift to take off with a given weight.
- (5) Velocity Limits Data: Gives the optimum (long range) speed and maximum rates of speed.

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### PERFORMANCE DATA TABLE DESCRIPTIONS

### 1. GENERAL THE STREET AT THE TO DO JONE STREET

This chapter describes each of the five basic type tables used for developing flight profiles. The variables within each type of table are described as well as how the specific data required can be extracted.

#### 2. BASIC FUEL FLOW DATA

- a. The basic rate of fuel flow\* is determined by five variables:
- (1) Type of aircraft
- (2) Altitude (Air Pressure)\*\*
- (3) Temperature\*\*\*
- (4) Gross Weight\*\*\*
- (5) Flight Mode
- b. In each table (see Table 3-1) within the basic type, the first three variables are held constant for the whole table, i.e., (a) Type of Aircraft, (b) Altitude (Air Pressure) above sea level, and (c) Temperature. These variables are stated at the top of each table.
- c. There are six rows of fixed gross weights for 225 RPM: 20,000 lbs, 24,000 lbs, 28,000 lbs, 32,000 lbs, 36,000 lbs, and 37,000 lbs. (Table 3-1) There are four rows of fixed gross weights for 230 RPM: 37,000 lbs, 38,000 lbs, 39,000 lbs, and 40,000 lbs. (Table 3-2) The ten columns are fixed flight modes.
- (1) The first column is Hover In Ground Effect (HIGE). HIGE is used for hovers at a height of 10 feet or less and a component of forward flight 10 kts or less.
- (2) The second column is Hover Out of Ground Effect (HOGE). This is used for hovers at a height of more than 10 feet.

<sup>\*</sup>The basic fuel flow data represents a clean drag configuration with all doors closed, no wing stores, and no external sling loads.

<sup>\*\*</sup>All altitudes or air pressures are feet above sea level.

\*\*\*For simplicity, all temperatures are considered to be the average
temperature in which the helicopter is operating (Degrees Centigrade).

\*\*\*\*Total vehicle weight in pounds.

- (3) The third column is Nap of the Earth (NOE). This is defined as all flight for variable speeds from 0 to 40 kts and variable altitudes.
- (4) The remaining seven columns are for given airspeeds\* (in kts) as the flight mode.
- d. There are 24 of these basic fuel flow charts. Each chart is for a different combination of Air Pressure (Altitude) and temperature.
- e. The Basic Fuel Flow Data is the main table used in simulating a flight profile. For example, assume a pilot's flight path will require 30 minutes of flight at 80 kts airspeed, 4000 ft. altitude, 15°C and a gross weight of 28000 lbs in a CH-47B helicopter. Using Table 3-1 at a gross weight of 28000 lbs and an airspeed of 80 kts, the helicopter will use 1610 lbs/hr fuel, i.e., for 30 minutes, 805 lbs of fuel will be used.
- f. The gross weight values selected provide the basic range of load carrying capability for the ten flight modes of the CHINOOK helicopter. Within the gross weight band shown, linear interpolation\*\* is quite accurate for estimating the fuel flow rates.
- g. For example, using Table 3-1, if the helicopter's gross weight was 30,000 lbs and if the flight mode was 60 kts, the fuel flow cannot be found directly. But by interpolating between 60 kts, 28,000 lbs 1648 lbs/hr and 32,000 lbs 1832 lbs/hr, the basic fuel flow rate for 30,000 lbs is 1740 lbs/hr. In this example, if the helicopter flies in this mode for 30 minutes, 870 lbs of fuel will be used.
- h. As altitude and/or temperature changes occur, different tables are used to look up the aircraft's basic fuel flow rate for each leg of the flight path. Care must be taken that the proper table is used.
  - i. Appendix A contains a set of functions that will give a good approximation of the basic rate of fuel flow.

#### 3. DELTA FUEL FLOW FOR DRAG DATA

- a. The delta fuel flow for drag is also determined by five variables:
- (1) Type of Aircraft
- (2) Altitude (Air Pressure)
- (3) Temperature
- (4) Drag Surface (Equivalent Square Footage)
- (5) Air Speed

<sup>\*</sup>All references to airspeeds are to true airspeeds.

\*\*All references to interpolation are linear interpolations. See FPPH,

Volume I, Chapter 3 for a discussion on the accuracy of interpolation.

TABLE 3-1

BASIC FUEL FLOW
FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LBS/HR
PKESSURE: 4060 FT TEMPERATURE: 15 C

AINCRAFT - CH-478 225 KFM

CHINOOK

GK055			17 1 10 1 20 1	FLIGHT	HT MOUE	E (KIS)	8 34	10	\$45 600 \$42 600	
(197)	391H	HOGE	HOE	04	09	90	100	120	140	160
20,000	5191	16/3	7961	1447	1332	1336	1436	1714	2178	2788
24.000	1775	1954	1790	1645	1489	1467	1549	1815	2268	2914
28,000	2008	2208	2024	1841	1648	1610	1684	1931	9252	OTOS
32,000	2249	2521	1677	20,60	1832	1769	1836	2070	1197	Inte
36,000	2530	2862	258g	2313	2032	1940	2006	5228	2673	2312
37,000	2603	2955	2668	2382	2084	1992	2053	2273	2721	1466

TABLE 3-2

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BASIC FUEL FLOW	
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	=
	3
	FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
	540
	FUEL
	3
	1
	-

PRESSURE: 4000 FT TEMPERATURE: 15 C. 230 RPH

AIRCRAFT - CH-478
CHINOOK

GROSS	13367			FLIG	FLIGHT MODE (KTS)	E (KTS	10 18	12 1/55		
(L85)	HIGE	HIGE HOGE	NOE	40	40 60 80 100 120 140 160	80	100	120	140	160
37,000	2610	2956	2678	2400	2610 2956 2678 2400 2110 2011 2068 2283 2723 3378	2011	2068	2283	2723	3378
38,000	2683	3048	2759	2469	3048 2759 2469 2163 2058	2058	2116	2116 2328 2769 3449	2769	3449
39,000	2759	3143	2841	2539	2759 3143 2841 2539 2218 2106 2165 2375 2820 3528	2106	5912	2375	2820	3528
40,000	2838	3242	2926	2613	2838 3242 2926 2613 2275 2156 2219 2426 2876 3616	2156	2219	2426	2876	3616

13

DRA LXTERNAL TEMPERATURE: CURRECTION FUEL FLOW LES/HR FOR PKESSUKE: 4000 FT

- CH-478 AIRCRAFT

is idling for 20 minutes or 1/3 of an hour, it will the 375 los of fuel.

4000 ft altitude, 15°C a

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C. The ground id? example flight profile iding for 20 minutes a

1124. Thus, the CH-478

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- b. Like the basic fuel flow tables, there are 24 tables for delta fuel flow for drag.
- c. There are four fixed rows of equivalent square feet of drag: 50 equivalent sq ft thru 200 equivalent sq ft.
- d. The seven columns are for airspeeds in kts of: 40 kts, 60 kts, 80 kts, 100 kts, 120 kts, 140 kts, and 160 kts.
- e. When an external load is placed on the helicopter, the amount of fuel consumed per hour increases. The delta fuel flow for drag tables indicate how much extra fuel consumption to add to the basic fuel flow rate.
- f. In the example given earlier, a 30 minute flight at 80 kts airspeed, 4000 ft altitude, 15°C and a gross weight of 28,000 lbs was used. Using the basic fuel flow tables, the basic fuel flow rate was 1610 lbs/hr. Assuming for this new example that part of the load is external and inducing a 100 equivalent sq ft external drag, the delta fuel flow for drag (Table 3-3) shows 221 lbs/hr should be added to the basic fuel flow rate. Thus the basic fuel flow rate becomes 1610 + 221 or 1831 lbs per hour and for a half-hour flight, 916 lbs of fuel will be used instead of the 805 lbs figured without an external load.
- g. Appendix B contains a function that will give a good approximation of the delta fuel flow for drag.

#### 4. GROUND IDLE FUEL FLOW DATA

- a. The ground idle fuel flow rate is determined by only three variables:
  - (1) Type of Aircraft
  - (2) Altitude (Air Pressure)
  - (3) Temperature
- b. There is only one ground idle fuel flow table (shown as Table 2-2). The table has four rows of temperatures:  $-25^{\circ}\text{C}$ ,  $-5^{\circ}\text{C}$ ,  $15^{\circ}\text{C}$  and  $35^{\circ}\text{C}$ , and six columns of altitudes: Sea Level, 2000 ft, 4000 ft., 6000 ft., 8000 ft., and 10000 ft.
- c. The ground idle fuel flow table is used as discussed in the example flight profile in Chapter 2 (Table 2-2). The CH-47B helicopter idling for 20 minutes at 2000 ft. altitude and 15°C, (across the row labeled 15°C and down the column labeled 2000) find the intersection at 1124. Thus, the CH-47B uses 1124 lbs/hr at these conditions and since it is idling for 20 minutes or 1/3 of an hour, it will use 375 lbs of fuel.

- d. If the helicopter had only been 1000 ft. above sea level, the consumption rate would be found by interpolating between the sea level rate of 1180 lbs/hr and the 2000 ft. rate of 1124 lbs/hr which would be 1152 lbs/hr. In 1/3 of an hour 384 lbs of fuel would be used.
- e. Appendix C contains a function that will give a good approximation of the ground idle fuel flow.

#### 5. GROSS WEIGHT LIMITS DATA

- a. Gross weight limits tables are intended to show whether or not the aircraft can safely take off for four sets of criteria. These criteria are defined in the following paragraphs:
- (1) Criteria #1 is based on the helicopter using 100% of Maximum Power for take off and having enough power to lift straight up and above ground effect (See Figure 3-1). Once it is in hovering above ground effect level the helicopter begins forward flight until it acquires, transitional lift and is able to climb at 450 ft/min (a desired standard rate of climb) to the desired altitude. This criteria has some risk since the pilot has no reserve power. It has less risk than Criteria #3 but more than Criteria #2 thus it is considered to be "Middle of the Road" risk.
- (2) Criteria #2 (Figure 3-1) is based on the helicopter using 95% of Maximum Power for take off and enough power to immediately begin to climb at a rate of 450 ft/min. This is the least risky criteria since the pilot has power in reserve and is still able to climb at a satisfactory rate.
- (3) Criteria #3 (Figure 3-1) has the most risk. Using 100% of Maximum Power the helicopter will only hover in ground effect. Therefore, at an altitude of 10 feet or less, the pilot must begin forward flight and gradually increase airspeed to acquire transitional lift to climb. The reasons for its high risk are readily apparent. First, there is no power in reserve. Second, the pilot must begin forward flight at a very low altitude.
- (4) Criteria #4. Structural Gross Weight Limits is the total upper limit of gross weight the helicopter can carry under any take off criteria.
  - b. Gross Weight Limits are determined by four variables:
  - (1) Type of Aircraft
  - (2) Criteria Chosen
  - (3) Altitude (Air Pressure)
  - (4) Temperature

CRITERIA #1

(MIDDLE OF THE ROAD)

100% MAX POWER, HOGE

TRANSITIONAL LIFT

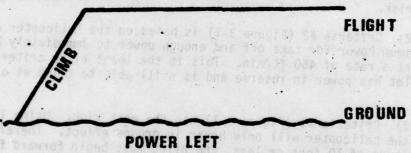
CLIMB

GROUN

NOTHING TO SPARE.

CRITERIA #2 (LEAST RISKY)

95% OF RATED POWER. VERTICAL RATE OF CLIMB 450 FT/MIN, HOGE



(MOST RISKY)

100% MAX POWER, HIGE

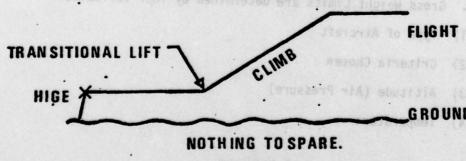


Figure 3-1

- c. Additionally, Criteria #1, #2, and #3 differ due to engine power limits or transmission power limits of the aircraft. Thus there are six tables:
  - (1) Criteria #1 (Due to engine)
  - (2) Criteria #1 (Due to transmission)
  - (3) Criteria #2 (Due to engine)
  - (4) Criteria #2 (Due to transmission)
  - (5) Criteria #3 (Due to engine)
  - (6) Criteria #3 (Due to transmission)
- d. The structural gross weight limit is a single value for each helicopter and is only dependent on the type helicopter. The CH-47B structural gross weight limit is given as 40,000 lbs and is listed at the bottom of each table. As the name implies, it is simply not safe to expect the CH-47B structure to maneuver normally when the total weight is larger than that value.
- e. In simulating inflight profile, the gross weight limits tables are used to check whether the aircraft is going to be too heavy to take off under the given conditions. As an example, assume the pilot of a CH-47B planned a mission that called for using take off criteria #1 and the take off was to be at 8000 ft., 15°C, and a gross weight of 31,200. Three checks would be required: First, does this gross weight exceed the structural gross weight limit? Second, does it exceed Criteria #1 (due to transmission)? Third, does it exceed Criteria #1 (due to engine)? In the example given, the answer to all three questions is "No", the take off will not exceed aircraft limits. (Tables 3-4 and 3-5)
- f. If the assigned gross weight had been 33,000 lbs, it would have exceeded the value given for 8,000 ft. and 15°C at Criteria #1 (Due to engine). (Table 3-4) The mission could not be flown as planned. The plan could be changed, for example to take off at 6000 ft. (which might not be practical) or change to take off Criteria #3 (which is more risky but has higher limits).
- g. If the assigned gross weight had been 41,000 lbs., it would have exceeded the structural limits. To perform the mission the only choices would be to lighten the load or get another type helicopter.
- h. Appendix D contains a set of functions that will give a good approximation of the gross weight limits for takeoff.

TABLE 3-4

1008 OF MAXIMUM POWER (HOGE)
AIRCRAFT - CH-47B 230 RPM
CHINDOK is simply not safe to enthe total weight GROSS WEIGHT LIMITS FOR TAKEOFF CRITERIA (DUE TO ENGINE)

poop a svip film unil another

1 3 190 206 1 70	96	PRESS	PRESSURE ALTITUDE (FT)	UDE (FT)	e e	8.2	
igh igh igh igh igh igh igh igh igh igh	0.78	SEA LEVEL	2000	4000	0009	8000	1 0000
	-25 C	51426	48680	45886	43055	40000	37109
DECEMBERATURE	-5 C	48259	45389	42347	39244	36389	33551
	1S C	44026	41097	38124	35361	32652	30149
CEN LORADE	3 S C	38611	36074	33530	31033	28690	26498

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN

000 Of a full burids expect the \*E 1 GH T GROSS TRUCTURAL Separate of

ers sit the ass

end to molitarizoneus

GROSS WEIGHT LIMITS

(DUE TO TRANSMISSION)

FOR TAKEOFF CRITERIA #1

1008 OF MAXIMUM POWER (HOGE)

AIRCRAFT - CH-47B 230 RPM

CHINOOK

the fastest spend at which a

	297	PRESS	PRESSURE ALTITUDE (FT)	UDE (FT)	.†1 18		ert (s
ivo	re ab	SEA LEVEL	2000	4000	0009	9000	1 0000
Sall A RESIDE	-25 C	64914	40829	39948	39042	38107	37109
DEGEES	) Su	40775	39904	39009	38087	37106	36079
CENTIGRADE	J 51	39915	39033	38124	37160	36149	35149
83	35 C	39102	38208	37263	36267	35277	34295

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

GROSS WEIGHT LIMIT: 40,000 LBS

There are val

Gross 4819

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#### 6. VELOCITY LIMITS DATA

- a. There are various types of data given in these tables but like the gross weight limits tables, they are primarily restraints on what can be expected of a helicopter in planning a mission profile. Velocity limits tables are influenced by five variables:
  - (1) Type of aircraft
  - (2) Air pressure (altitude)
  - (3) Temperature
  - (4) Gross weight
  - (5) Condition or limit
- b. Items (1) through (4) are self-explanatory. There are five types of information that can be listed under (5):
  - (1) Long range
  - (2) Maximum continuous power
  - (3) Maximum power (due to engine limits)
  - (4) Transmission limits
  - (5) V<sub>ne</sub>(velocity never exceed)
- c. For each aircraft, there are 24 Velocity Limits Tables depending on air pressure and temperature combination. Table 3-6 is an example of the content of the Velocity Limits Table.
- d. The two columns under Long Range (Table 3-6) give the optimum speed and fuel flow for each set of variables #1 through #4 above. Thus the CH-47B operating at 2000 ft., temperature 15°C, and having a gross weight of 28,000 lbs will fly a longer distance if the velocity is kept at 125 kts and will use 2114 lbs/hr of fuel at that velocity.
- e. Maximum continuous power gives the fastest speed at which a helicopter can fly for long periods (30 minutes or more) and the associated fuel flow rate. An example from Table 3-6 would be a CH-47B at 2000 ft. and 15° weighing 28,000 lbs could fly 154 kts with a fuel usage of 2945 lbs/hr.

Loffifeniz vilanoidanini ea TEMPERATURE: 15 TABLE 3-6
VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW MATES) 225 KPM AIRCRAFT - CH-47B PRESSURE: 2000 FT

CHINOOK

ed you (velocity never helitopper structural MERC as maximum power

									-	
	a R	LONG	CONT	CONTINUOUS	E POS	MAX POWER (ENGINE)	TRANS	TRANSMISSION LIMI IS	VELOCI	VELOCITY NEVE
: 3	(KFS)	VEL F.F.	(KĘS)	(KFS) (LBS/HR)	(KTS)	VEL LUSTHRI		(KTS) (LBS/HK)	(KTS)	KTS) LBS/HR
GRUSS WEIGHTS						III S DITTE NWORLE - X-	t aft digin	in beat inte 1 i IS bire bender	f118- m131p	Etuli ent to Lan en to tan
20,000	121	1841	160	2945	173	5391	165	3111	157	2861
24,000	121	1927	156 2945	2945	169	5391	161	9111	157	2973
28,000	125	2114	154	2945	165	5391	158	3111	157	3079
32.000	128	2300	121	2945	163	3391	155	3111	157	3175
36,000	130	2513	146	2945	160	5391	151	3111	140	2758
37.000	131	2565	145	2945	158	158 3391	150	3111	134	2644

- f. Maximum power (engine and transmission limits) show the maximum speeds the aircraft can structurally attain for short periods of time (less than 30 minutes). Thus the CH-47B helicopter at 2000 ft and 15°C weighing 28,000 lbs has an engine that is capable of producing enough power to fly 165 kts but the transmission limits the aircraft to 158 kts. Between these two columns then, the flight cannot exceed 158 kts with a fuel flow rate of 3111 lbs/hr.
- g. There is another limiting factor called  $V_{ne}$  (velocity never exceed). This velocity limit is determined by helicopter structural considerations.  $V_{ne}$ 's are used in the same manner as maximum power limits described in paragraph f above. Since a value of 157 kts is listed for 2,000 ft., 15°C, and 28,000 lbs, this implies that the value in f. cannot be reached.

#### 7. DETAILED FLIGHT PROFILE USING ALL PERFORMANCE DATA TABLES

The example of a Flight Profile in Chapter 2 was intentionally simplified to assure clarity. The description of the various tables in this handbook, however, indicates a more complex set of considerations are normally encountered in developing the flight profile. With the description provided in this chapter, additional information should be included in the flight plan beyond that shown in the example and a suggested format is provided below in Table 3-7.

TABLE 3-7

Helicopter: Altitude: Temperature:

LEG	DISTANCE	AS	CHECK VELOCITY LIMIT	TIME	GW (LBS)	DRAG	FUEL
			F 12				
			28   "		10		
	2004		E.		L. Ž		
	<b>以</b>		No. To				

Needed for each take off:
Weight at take off:
Type of take off:
Check transmission limits:
Check engine limits:
Check structural gross weight limit:

#### CHAPTER 4

#### CHINOOK (CH-47B) PERFORMANCE DATA TABLES (225 RPM)

#### GENERAL

The following tables are the major information presented in this hand-book. If the procedure for using them is understood, a flight profile for the CHINOOK (CH-47B) helicopter can be prepared in a matter of a few hours. The performance data contained have been reviewed for accuracy and are corrected to the best of our knowledge. The tables are organized in the following manner:

Tables 4-1 to 4-24

Basic Fuel Flow Data

Tables 4-25 to 4-48

Delta Fuel Flow for Drag Data

Table 4-49

Ground Idle Fuel Flow Data

Tables 4-50 to 4-55

Gross Weight Limits Data

Tables 4-56 to 4-79

Velocity Limits Data

BASIC FUEL FLOW DATA

TABLES
(225 RPM)



TABLE 4-1

BASIC FUEL FLOW

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUS/HR

PRESSURE; SEA LEVEL TEMPERATURE: -25 C

AIRCRAFT - CH-47B 225 KPM CHINOOK

GROSS		9 1	1 2 1 2 2 2	FLIG	FLIGHT MODE (KIS)	E IKIS	10 I	R8   5m	25 80	PT   Da
(LBS)	HIGE	HOOF	NOE	0+	09	08	100	120	140	160
20,000	1558	1667	1561	1454	1361	1450	1606	2039	2725	1996
24 • 000	1753	1897	1921	1625	1504	1961	1709	2129	2806	19697
28,000	1968	2146	1985	1823	1660	1669	1821	2253	2900	3805
32,000	2196	2407	2217	2028	1823	1909	1947	2345	3008	4038
36,000	2429	2680	2451	2222	1986	1958	2091	2471	3129	4196
37,000	2488	2749	2510	2510 2571	2029	1561	2129	2506		3195 4234

TABLE 4-2 BASIC FUEL FLOW

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUSTHR

PRESSURE: SEA LEVEL TEMPERATURE: -5 C

AJRURAFT - CH-476 225 RFM

CHINOOK

GROSS		1 1 1 1 1 1		FLIG	FLIGHT MODE	E (KIS)			345	
(LBS)	HIGE	HOPE	NOE	04	09	98	100	120	140	160
20,000	1995	1707	1598	1488	1390	1432	1587	1965	2571	3316
24+000	1796	1944	1807	1671	1539	1554	1688	2022	2651	3452
26,000	5019	2201	2037	1872	1691	1683	1800	2155	2744	3559
32,000	2252	2406	2268	20,70	1855	1825	1950	2268	2848	3678
36+000	2483	2753	2511	2269	2023	1975	2077	2394	5968	3810
37,000	2542	2829	2575	2322	2068	2010	2116	2430	3000	3838

FUEL FLOW MATES FOR THE GIVEN CONDITIONS IN LUS/HR PRESSURE: SEA LEVEL TEMPERATURE: 15 C TABLE 4-3
bASIC FUEL FLUW

225 KPM AIRCRAFT - CH-478

CHINOOK

SKOSS.				FLIG	HT MOU	FLIGHT MODE (KIS)	,		10	
(LBS)	HIGE	HOPE	NOE	0%	09	na	100	120	041	100
20,000	1631	1747	1635	1524	1422	1451	1583	1914	2461	3141
24,000	1839	1661	1854	1717	1576	1574	1685	2005	2540	3250
28,000	2068	5254	2085	1916	1735	1700	1800	2108	2632	3380
32,000	2301	2526	2318	2111	1891	1848	1925	2223	2739	0/ hc
36,000	2537	2834	2579	2325	2070	2002	2084	2358	2869	1996
37,000	2600	2915	2649	2383	2118	1400	2124	2995	2905	3590

TABLE 4-4 BASIC FUEL FLUW

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUS/HR PRESSURE: SEA LEVEL TEMPERATURE: 35 C

AIRCRAFT - CH-478 225 KPM

GROSS	100			FLIG	FLIGHT MOUL (KIS)	E (KIS	50 Se		191	
(LBS)	HIGE	HIGE HOSE	NOE	04	00		80 100 120 140 100	120	041	100
20,000	1668	1786	1674	1562	1455	1471	1455 1471 1585 1884 2383	1884	2383	6106
24 • 000	1882	2036	1898		1612	1597	1761 1612 1597 1690 1976 2463	1976	2463	1515
28,000	2114	2114 2304	2129	2129 1953 1767	1767	1735 1	1812	2080	1812 2080 S54 5238	3238
32,000	2347		2590 2373 2155 1932	2155	1932	1879	1879 1950 2202 2665 5319	2202	2665	5319
36,000	2598	2918	2653	2387	2162	2042	2598 2918 2653 2387 2142 2042 2104 2346 2806 3432	2346	2806	3432
37.000	7667	3004	7070	2,40	2170	SHAD	77 mc 2446 4466 2416 6416 6716 9446 7676 4105 7349	2384	SHEE	77.46

TABLE 4-5 BASIC FUEL FLOW

FUEL FLOW MATES FOR THE GIVEN CONDITIONS IN LBS/HR PRESSUKE: 2000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 225 KFM

CHINOOK

GROSS				FLIG	SHT MOL	FLIGHT MOUE (KIS)				100
(182)	H16E	HOGE	NOE	0+	09	20	100	120	140	160
20,000	1515	1628	1518	1409	1314	1362	1528	1926	2561	3343
24.000	1718	1867	1729	1591	1463	1480	1634	2022	2647	3503
28,000	1941	2122	1959	1797	1623	1619	1753	2129	2748	36/9
32,000	2172	2390	2192	1995	1766	1764	1890	5546	2862	3845
36,000	2407	5609	2431	2193	1956	1351	2041	2387	3034	2448
37.000	2466	2744	2495	2247	2001	1962	2080	2425	3076	4637

50

TABLE 4-6

BASIC FUEL PLOW

FUEL FLOW KATES FOR THE GIVEN CONUITIONS IN LBS/HR

AIRCRAFT - CH-47B 225 KFM

PRESSURE: 2000 FT TEMPERATURE: -5 C

GROSS				FLIG	HT MUL	FLIGHT MOUE (KIS)	3 3 6 6			
(CRS)	HIGE	HOPE	NOE	010	09	90	100	120	041	140 1en
20,000	1551	1667	1667 1556	1445 1343 1374	1343	1374		1854	2417	1511 1654 2417 3114
24.000	1761	1914	1914 1776	1637	1497	1499	1615	1950	2503	3238
28,000	1991	21/5	2007	1839	1655	1632	1735	2058	2601	3371
32,000	2223	2451	2243	2035	1817	1779	1876	2177	2712	3476
36,000	2462	2753	2501	2248	1998 1940	1940	2030	2319	2846	1196
37,000	2526	2833	2570	2307	2047	1982	2070	2358	2885	3653

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 2000 FT TEMPERATURE: 15 C BASIC FUEL FLOW

225 KPM AIRCRAFT - CH-47B CHINOOK

GROSS				FLIG	FLIGHT MODE (KIS)	E (KIS	,	180		
WEIGHIS (LBS)	HIGE	HOGE	NOE	04	09	9	100		120 140	100
20,000	1587	1707	1595	1483	1375	1361	1506	1810	2514	2956
24,000	1804	1961	1851	1681	1532	1518	1613	1906	5366	3083
28,000	2038	2227	2051	1876	1688	1655	1738	2015	7645	3192
32,000	2270	2517	2298	2080	1856	1800	1881	2141	2017	5281
36,000	2525	2842	2577	2311	2049	161	2040	2288	2763	2403
37,000	2596	2926	2650	2374	2099	SING	2042	2328	2803	3455

TABLE 4-8

BASIC FUEL FLOW

FUEL FLOW MATES FOR THE GIVEN CONDITIONS IN LUSTHR

PRESSURE: 2000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-476 225 KPM

GROSS WE FEET				FLIG	HT MOU	FLIGHT MOUE (KIS)	1 3008		1000	
((-65)	HIGE	HOOF	HOE	04	09	ВU		120	100 120 140	160
20.000	1624	1746	1633	1521	1407	1447 1411 1509 1783 2242 2840	1509	1783	2242	2840
24 • 000	1846	2005	1862	1719	1564		1541 1621 1880 2326 2953	1880	2326	2903
28,000	2080	22/9	2096	1912	1721	1912 1721 1682 1751 1991 2426	1751	1991	2426	5051
32,000	2319	2589	2360	2131	1900		1837 1898 2126 2554 3139	2126	2554	5139
36,000	2597	2931	2656	2380	2380 2101	2010	2010 2064 2279 2714 3528	2279	2714	3328
37,000	2673	3021	2734	2447	2152	2/34 2447 2152 2056 2110 2320 3760 3402	2110	2320	27611	34112

TABLE 4-9

BASIC FUEL FLOW FUEL FLOW FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 4000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 225 KPM

GROSS				FLIG	FLIGHT MOUE	E (K(S)	,	tal Ta		
(FBS)	391H	HOUE	HOE	94	09	na	100	120	140	100
20,000	1477	1595	7485	1370	1271	1308	1456	1881	2407	3168
24 • 000	1689	1842	1703	1565	1426	1435	1567	1923	2500	3321
28,000	1918	2103	1936	1769	1589	1574	1694	9502	2608	3502
32,000	2151	2377	2171	1964	1754	1726	0481	5917	2761	9696
36,000	2388	2617	2429	2180	1935	1890	1998	2317	6262	1186
37,000	6442	8C12	5499	2240	1984	1935	2040	2557	7745	SABS

TABLE 4-10

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUS/HR
PRESSURE: #000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-476 225 KPM

GROSS				FL16	FLIGHT MOUE (KIS)	E (KIS	1			
(LBS)	HIGE	HOGE	NOE	01	09	BU	100	120	041	160
20,000	1513	1634	1551	1408	1301	1319	1439	1754	2274	2932
24,000	1733	1889	1748	1608	1458	1448	1549	1856	2366	3067
28,000	1965	2155	1980	1805	1617	1588	1680	1969	2469	3186
32,000	2198	2447	2227	2008	1788	1742	1829	2100	2592	3315
36,000	5454	2769	2506	2243	1982	1912	1990	2256	2747	3467
37.000	2522	2855	2561	2307	2032	1950	2033	2298	2791	354

TABLE 4-11

BASIC FUEL FLOW FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUSTHR

AIRCRAFT - CH-478 225 KPM

PKESSURE: 4000 FT TEMPERATURE: 15 C

GROSS	13			FLIG	HT MOU	FLIGHT MOUE (KIS)	1 100	5 1 10	1,550	
WEIGHTS (LBS)	HIGE	HOPE	HIGE HOGE NOE		40 60	80	8U 100 120 140 16U	120	140	160
20.000	1549	16/3	1549 16/3 1560 1447 1332 1336 1436 1714 2178 2788	1447	1332	1330	1436	1714	2178	2786
24.000	1775	1954	1775 1934 1790 1645 1489 1467 1549 1815 2268	1645	1489	1467	1549	1815	2268	2914
28,000	2008	2208	22u8 2u24 1841 1648 161u 1684 1931 2376 3U1U	1841	1648	1610	1684	1931	2376	3010
32,000	2249	2521	2249 2521 2291 2060 1832 1769 1836 2070 2511 51U/	2060	1832	1769	1836	2070	2511	310
36,000	2530	2862	2530 2862 2586 2313 2032 1946 2006 2229 2673 3312	2313	2032	1940	2006	2229	2673	331
37.000	2603	2955	2603 2955 2666 2382 2084 1992 2053 2273 2721 3391	2382	2084	1992	2053	2273	2721	339

TABLE 4-12

BASIC FUEL FLOW FUEL FLOW FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LBS/HR

AIRCRAFT - CH-47B 225 KPM

PRESSURE: 4000 FT TEMPERATURE: 35 C

GROSS.				FLIG	HT MOL	FLIGHT MOUE (KIS)				10 May 10
(LBS)	<b>H16E</b>	HOPE	NOE	0,7	09	80	100	120	140	160
20,000	1585	1711	1598	1484	1363	1356	1439	1089	2111	7997
24,000	1815	1977	1828	1678	1519	1490	1559	1791	2201	2792
26,000	5046	2265	2073	1881	1685	1637	1697	1914	2313	2873
32,000	2307	2598	2358	2118	1878	1802	1855	2061	2460	3005
36,000	2608	2963	2675	2388	2086	1989	2040	2231	5646	3301
37,000	2686	3003	2763	2945	2143	THOS	2094	2287	2711	3398

TABLE 4-13

BASIC FUEL FLOW FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUSTHR

AIRCRAFT - CH-478 225 KPM

TEMPERATURE: -25 C

PRESSURE: 6000 FT

GROSS MF 16 LTC				FLIG	HT MOU	FLIGHT MOUE (KIS)	•			
(LBS)	39TH	HOPE	JON	07	09	กล	100	150	140	100
20,000	hhhI	1567	1452	1338	1234	1259	1390	1725	2265	2991
24,000	1665	1850	1681	1541	1393	1390	1507	1831	2364	3164
28+000	1897	2089	1914	1739	1556	1530	1644	1952	2480	3330
32,000	2132	2373	2158	1943	1730	1695	1797	2094	2055	3483
36,000	2381	2698	2439	2180	1925	1961	1964	5256	2847	2680
37,000	2451	2783	2513	2242	1977	1915	2010	5566	2900	3749

TABLE 4-14

BASIC FUEL FLOW

FUEL FLOW MATES FOR THE GIVEN CONDITIONS IN LUSTHR

AIRCRAFT - CH-478 225 KPM

PRESSURE: 6000 FT TEMPERATURE: -5 C

CKUSS.				FLIG	HT MOU	FLIGHT MOUE (KIS)	)	1927   N	20d 1	
(LUS)	HIGE	HOGE	NOE	0 17	09	AU.	100	120	041	160
20.000	1480	1606	1641	1377	1263	1269	1373	1993	2141	2767
24.000	1709	1866	1722	1578	1421	1402	1491	1770	2238	2901
20.000	1940	2143	1959	1775	1584	1549	1632	1890	2350	3006
32,000	2184	2451	2223	1995	1769	1715	1788	2037	2490	3155
301000	2459	27%	2523	2251	1971	1891	1963	2204	2067	3391
37 c 00 u	2535	2889	2603 2318	2318	2024	1939	2012	2250	2718	34.79

TABLE 4-15

BASIC FUEL FLUW

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 6000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-47B 225 KFM CHINDOK

GROSS				FLIG	HT MOU	FLIGHT MOUE (KIS)	,			
(LBS)	HIGE	HOPE	NOE	07	09	80	100	120	140	100
20.000	1516	1645	1530	1414	1293	1286	1371	1625	202	2634
24+000	1749	1910	1760	1610	1449	1451	1493	1732	2149	2748
28.000	1981	2203	2009	1815	1619	1572	1637	1859	5269	2837
32 • 000	2245	2591	2572	2054	1815	1742	1799	2011	2420	2982
36+000	2541	2903	2615	2328	2024	1931	1989	2193	2019	9538
37.000	2621	3004	2702	2401	2083	1983	5002	2252	2687	865C

40

TABLE 4-16

BASIC FUEL FLOW

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUSTHR

PRESSURE: 6000 FT TEMPERATURE: 35 C AIRCRAFT - CH-47B 225 KFM

GROSS				FLIG	HT MOU	FLIGHT MODE (KIS)	•			
(LBS)	HIGE	HOSE	NGE	04	09	96	100	120	140	160
20,000	1552	1682	1565	1448	1322	1305	1376	1603	1989	2535
24,000	1785	1955	1798	1641	1478	1444	1504	1/12	2087	2620
28,000	2026	2266	2064	1862	1658	1600	1652	1848	2216	2719
32,000	2312	2614	2365	2117	1861	1777	1824	2002	2384	1462
36,000	2626	3013	2713	2413	2091	1986	2043	2236	2643	3324
37,000	2711	3117	2805	2493	2159	2045	2110	2319	2730	34.35

TABLE 4-17

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUS/HR PRESSURE: 8000 FT TEMPERATURE: -25 C BASIC FUEL FLOW

225 KFM AIRCRAFT - CH-47B CHINOOK

GROSS				FLIG	FLIGHT MOUE	(KIS)		1448		
(LBS)	H16E	HOGE	NOE	77	09	98	100	120	041	100
20.000	1417	1543	1428	1313	1201	1215	1329	1636	2134	2833
24,000	1645	1803	1660	1517	1363	1321	1454	1748	0422	2008
28,000	1878	2078	1896	1713	1529	1504	1601	1879	5652	4016
32,000	2118	2387	2912	1937	1715	1670	1762	2034	5269	2000
36,000	2395	2731	2459	2188	1923	1855	1945	2206	27.85	196
37,000	2470	2823	2540	2256	1977	1905	1995	2254	2482	1716

TABLE 4-18

BASIC FUEL FLUW

FUEL FLOW KATES FOR THE GIVEN CUNDITIONS IN LISTHR

AIRCKAFT - CH-476 225 KFM

TEMPERATURE: -5 C

PRESSURE: 8000 FT

CHINOOK

TABLE 4-19

BASIC FUEL FLOW

FUEL FLOW MATES FOR THE GIVEN CONDITIONS IN LUS/HR PRESSURE: 8000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-478 225 KFM

GROSS				FLIG	FLIGHT MOUE	(KIS)	•	100	1 2 M B 1	TORUS TO
(LBS)	391H	HOOF	HOE	04	99	80	100	120	140	160
20,000	1489	1621	1502	1384	1256	1240	1312	1544	1935	1842
24.000	1722	1895	1736	1579	1414	1361	1445	1658	2041	2580
28,000	1966	2208	2004	1800	1599	1542	1598	1/98	2177	2688
32,000	2252	2558	2510	2061	1801	1722	1774	1963	2549	2931
36+000	2570	2959	2657	2355	2040	1936	2005	2210	2632	3331
37,000	2656	3064	2751	2437	2110	1999	2075	2293	27.52	3446

TABLE 4-20

BASIC FUEL FLUW

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LOS/HR

PRESSURE: 8000 FT TEMPERATURE: 35 C AIRCRAFT - CH-47B 225 KPM

SKOSS LETESTS				FLIG	HT MOU	FLIGHT MOUE (KIS)	•			
(LBS)	HIGE	HOPE	NOE	011	000	98	100	120	140	100
20.000	1523	1657	1535	1413	1262	1259	1320	1523	1877	2380
24,000	1757	1941	1777	1613	1445	1405	1457	1643	1986	5409
28 000	2019	2276	2064	1852	1639	1571	1615	1791	2135	2610
32,000	2324	2653	2952	2131	1853	1765	1811	1978	2344	2940
36,000	2665	3075	2767	2459	2128	2002	2081	2307	2728	3404
37,000	2756	3192	2875	255A	2500	55177	2150	7.146	SHE	1444

TABLE 4-21

BASIC FUEL FLUW
FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUSTHR

PHESSURE: 10000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-47B 225 KFM

oROSS WF TGETS				FLIG	HT MOU	FLIGHT MOUE (KIS)	,			
(LBS)	HIGE	HOOF	HOE	04	09	9	100	120	041	160
20,000	1395	1523	1408	1292	1172	1175	1274	1555	2013	2688
24+000	1626	1790	1641	1641	1334	1317	1409	1074	2212	2856
28,000	1862	2078	1888	1698	1509	1477	1564	1818	2902	3010
32,000	2121	2410	2175	0461	1710	1655	1737	1983	2502	3236
36,000	2421	2783	2498	2214	1927	1855	1941	2208	2761	2645
37,000	2500	2884	2586	2288	1985	1969	1000	SUNG FFCC	SHE	11/2/5

TABLE 4-22

BASIC FUEL FLOW
FUEL FLOW KATES FOR THE GIVEN CUNUILLIONS IN LBS/HR
PRESSURE: 10000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-47B 225 KFM CHINOOK

GROSS.				FLIG	H MOU	FLIGHT MOUE (KIS)	) De 1			
(LBS)	HIGE	HOGE	NOE	07	09	90	100	120	140	100
20,000	1431	1562	1444	1325	1196	1185	1260	1502	1905	24/1
24,000	1663	1837	1679	1521	1358	1326	1400	1621	2015	2578
28,000	1910	2148	1946	1745	1545	1495	1557	1769	2159	87.28
32,000	2194	2502	2254	2006	1751	1670	1739	1942	5346	6000
36,000	2515	2906	2605	2304	1952	1659	1978	8617	4292	6446
37,000	2601	3011	2699	2387	2061	1965	2047	2287	2782	1125

**TABLE 4-23** 

BASIC FUEL FLUW

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUSTHR

PRESSURE: 10000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-476 225 KPM

GROSS.			100	FLIG	HT MOU	FLIGHT MODE (KIS)	) ITEL			
(LBS)	HIGE	HOPE	HOE	04	09	80	100	120	140	100
20,000	1466	1599	1476	1353	1220	1199	1261	1470	1828	2343
24+000	1698	1888	1722	1556	1388	1348	1404	1594	1946	2433
28,000	1966	2219	2008	1798	1584	1519	1567	1747	2099	2591
32,000	5269	2603	2541	2078	1802	1716	1770	1949	2324	2942
36,000	2615	3000	2723	2416	2083	1968	2050	2291	2733	3432
37,000	2706	3148	2832	2517 2162	2162	S038	9116	7956	2866	19601

TABLE 4-24 BASIC FUEL FLOW

FUEL FLOW KATES FOR THE GIVEN CONDITIONS IN LUS/HR

PRESSURE: 10000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 225 KFM

SEOSS.				FLIG	HT MOU	FLIGHT MODE (KIS)	).		1000	
(CES)	HIGE	HOPE	NOE	04	09	99	100	120	140	100
20 • 000	1497	1635	1507	1379	1244	1218	1270	1451	1774	1424
24.000	1736	1943	1769	1596	1422	1372	1416	1585	1900	2552
28,000	2026	2294	2074	1854	1625	1551	1691	1744	<b>2073</b>	2569
32,000	2348	2701	2431	2160	1870	1771	1828	2012	2376	1167
36,000	2713	3167	2864	2561	2191	2050	2135	2419	2892	1690
37 • 000	2811	3292	2968	2684	2281	2130	2214	2534	3050	2823

DELTA FUEL FLOW FOR DRAG DATA

TABLES
(225 RPM)

TABLE 4-25
CURKECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG
PRESSURE; SEA LEVEL TEMPERATURE: -25 C
AIRCRAFT \_ CH-47B 225 KPM
CHINOOK

				AIR SI	AIR SPEED IN NIS			
14.2	788	077	09	80	100	120	140	160
DAVE.	50	18	62	147	596	214	803	1201
DRAG	101	2.7	124	297	069	1016	1608 2402	240
Z	201	25.0	187	450	888	1523	2412	3602
SOUARE FEET	200	7	-	601	1178	2029	3216	4803

THECEDING PAGE NOT FILMED

TABLE 4-26

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: SEA LEVEL TEMPERATURE: -5 C AIRCRAFT - CH-47B 225 RPM

				AIR S	AIR SPEED IN KIS	N KTS	0.5	
		04	99	80	100	120	140	160
DA GO	20	17	58	156	172	472	745	1111
J. J.	100	34	115	274	545	945	1488	2222
TODE CEET	150	51	173	414	817	1#11	2232	3335
SOUND THE	200	89	231	555	1093	1879	2976	4445

**TABLE 4-27** 

CORRECTION FUEL FLOW LES/HR FOR EXTERNAL DRAG PRESSURE: SEA LEVEL TEMPERATURE: 15 C AIRCRAFT - CH-478 225 KPM

A TENTANT				AIR S	AIR SPEED IN KIS	N KIS	000	- F-02-10
100		040	09	90	100	120	140	160
OAAG CAGO	20	16	54	127	250	439	169	1035
DRAG	100	32	108	254	205	882	1388 2	2069
N	150	48	191	384	758	1314	2081	3103
WUAKE FEET	200	63	215	514	1014	1751	2774	4137

TABLE 4-28

CORRECTION FUEL FLOW LES/HR FOR EXTERNAL DRAG

AIKCRAFT - CH-476 225 KPM

TOTAL STATE				AIR S	AIR SPEED IN RIS	N KIS		
1 100		0#	09	90	100	120	140	160
DAGE	20	15	20	119	232	412	653	996
2	100	30	101	258	024	623	1298	1935
THE PERSON	150	77	151	998	709	1230	1946	2899
	200	69	201	479	945	1639	2594	3866

TABLE 4-29
CURRECTION FUEL FLOW LBS/HR FOR EXTERNAL URAGE
PRESSURE: 2000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-47B 225 RFM CHINOOK

				AIR S	AIR SPEED IN KIS	N KTS		
SIN SIN		97	09	80	100	120	140	160
DRAG	20	71 -	58	138	275	476	748	1110
2	100	35	116	278	549	945	1495	2233
WINDE SEET	150	55	174	420	826	1915	2243	3349
	200	20	234	.095	1095	1686	2991	4466

TABLE 4-30

CURMECTION FUEL FLOW LDS/HR FOR EXTERNAL UNAG PRESSURE: 2000 FT TEMPERATURE: -5 C

AINCRAFT - CH-476 225 KFM

L THE WORLD				AIR	FEED 1	SIN		
		07	09	80	100	120	140	160
SAUG	20	16	53	127	253	439	069	1033
DRAG	100	32	107	556	205	478	1382	5066
NY NY	150	48	161	386	762	1311	2074	3100
SOUNDE LEE!	200	₩9	215	517	1017	1747	2766	4133

TABLE 4-31

CORRECTION FUEL FLOW LESTHR FOR EXTERNAL DRAG PRESSURE: 2000 FT TEMPERATURE: 15 C

AIRCHAFT - CH-47B 225 KPM

	1		345	AIR SH	SPEED IN KIS	N KIS	145	
		04	09	80	100	120	140	160
9000	20	15	20	118	234	804	6#9	796
DRAG	100	30	66	237	471	819	1290	1925
NA SCALL	150	45	149	358	706	1222	1934	2884
SWUNKE FEET	200	09	260	084	546	1627	2578	3846

TABLE 4-32

CURRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 2000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 225 RPM

CHINOOK

				AIR S	SPEED I	IN KIS	[3162	0.400
		64	69	90	100	120	140	160
OWAG	20	14	47	110	717	283	909	668
NI NI	100	28	65	221	439	766	1207	1798
THEFT	150	45	140	333	629	1143	1810	2697
	200	26	166	447	089	1523	2418	3596

TABLE 4-33
CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG
PRESSURE: 4000 FT TEMPERATURE: -25 C
AIRCRAFT - CH-47b 225 KPM
CHINDOK

				AIR S	SPEED I	IN KTS	100 N	6000
		07	09	98	100	120	140	160
2000	20	16	54	129	526	244	969	1037
UNAG	100	33	109	997	910	878	1390	2074
-	150	64	164	391	767	1315	2084	3111
SWUARE FEET	200	9	219	521	1017	1752	2779	4147

**TABLE 4-34** 

CURRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 4000 FT TEMPERATURE: -5 C AIRCRAFT - CH-47B 225 RPM

				AIR SI	PEED I	AIR SPEED IN KTS	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
		04	09	90	100	120	140	160
DRAG	20	15	១ទ	119	236	408	049	656
2	100	30	100	239	471	611	1283	1919
SWIIARE FEET	150	45	151	361	602	1217	1926	2878
	200	09	202	482	116	1622	2569	3838

**TABLE 4-35** 

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL URAS PRESSURE: #000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-476 225 KPM

CHINOOK

F PANTAGE ENT				AIR SI	AIR SPEED IN KIS	N KIS		0.00
13		04	69	. 80	100	120	140	160
Data	50	14	94	110	218	976	669	893
DRAG	100	28	93	221	439	759	1197	1786
NI	150	42	140	334	657	1134	9621	5679
SWUAKE FEE!	200	56	167	447	879	1161	1984	3571

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TABLE 4-36
CURRECTION FUEL FLOW LBS/MR FOR EXTERNAL DMAG
PRESSURE: 4000 FT TEMPERATURE: 35 C
AIRCRAFT - CH-478 225 RPM

225 KPM	
AIRCHAFT - CH-478	CHINOOK
AIR	

				AIR SI	AIR SPEED IN KIS	N KIS	S. Carlot	23.7
		0 7	09	. 80	100	120	140	160
0046	20	13	64	102	203	355	562	835
San San	100	56	98	506	604	712	1121	1670
Canade ceer	150	39	130	311	613	1001	1681	2505
SOUNE PEE	200	25	174	417	820	1914	2240	3340

**TABLE 4-37** 

CURMECTION FUEL FLOW LBS/HR FOR EXTERNAL URAGE PRESSURE; 5000 FT TEMPERATURE: -25 C AIRCRAFT - CH-476 225 KPM

CHINOOK

7)

PATHER FEE				AIR SI	AIR SPEED IN NTS	N KTS		6 1636
		04	09	. 80	100	120	140	160
CHAMO	20	15	21	121	237	504	945	796
ON TO	100	30	102	243	<b>#</b> 2#	914	1290	1924
NT AGAIN	150	94	153	364	711	1220	1934	2886
WOAKE FEE!	200	61	205	484	546	1626	2579	3848

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TABLE 4-38

CURRECTION FUEL FLOW LBS/HH FOR EXTERNAL DRAG PRESSURE: 6000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-478 225 KPM

				AIR SH	AIR SPEED IN KIS	NKTS		40
111		040	09	08 .	100	120	140	160
CHAR	20	14	47	111	220	379	593	890
UKA6	100	28	<del>116</del>	42S	437	753	1190	1780
	150	45	141	336	659	1129	1787	2671
SECARE LEE!	200	99	189	844	875	1504	2383	3561

**TABLE 4-39** 

CORRECTION FUEL FLOW LDS/MR FOR EXTERNAL URAGE PRESSURE: 6000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-476 225 KFM

SOUNDE PER		B) etyl		AIR SI	AIR SPEED IN KIS	N KIS		
F10		0,4	99	. 60	100	120	140	160
DRAG	20	13	43	103	<b>504</b>	351	555	828
Z	100	56	87	207	407	703	1110	1657
TOOD SOUTH	150	39	131	312	611	1052	1665	2485
TOWNE LEE!	200	55	175	416	817	1401	2220	3315

TABLE 4-40

CURRECTION FUEL FLOW LES/HR FOR EXTERNAL DRAG PRESSURE: 6000 FT TEMPERATURE: 55 C

AINCRAFT - CH-47B 225 HPM

				AIR S	AIR SPEED IN KIS	N KIS		
		0.4	09	. 80	100	750	140	160
DRAG	20	12	94	96	190	329	521	776
2	100	54	81	193	381	099	1040	1550
ALL SECT	15u	37	122	291	970	984	1559	2325
MONKE FEET	200	64	163	389	763	1311	2078	3099

TABLE 4-41
CORMECTION FUEL FLOW LDS/HR FOR EXTERNAL DRAG
PRESSURE: 8000 FT TEMPERATURE: -25 C
AIRCRAFT - CH-47B 225 KPM

PHILIPPIP LIN			5.4	AIR S	AIR SPEED IN KIS	N KTS		
N. Ja		04	09	. 80	100	120	140	160
SAJES OF THE	PΩ	14	48	113	219	378	598	892
DAMO	100	28	95	225	439	754	1195	1783
ANA SECT	150	45	143	537	657	1130	1792	2675
SWUNNE LEE!	200	56	190	644	874	1506	2390	3566

TABLE 4-42

CORRECTION FUEL FLOW LES/HR FOR EXTERNAL URAGE PRESSURE: 8000 FT TEMPERATURE: -5 C AIRCRAFT - CH-47B 225 RPM

ME SPET			10	AIR S	SPEED IN	N KTS		100
	3.0	04	09	. 80	100	120	140	160
9000	20	13	hh	104	204	352	551	825
UKAG	100	56	88	208	406	969	1100	1650
NI	150	39	132	312	611	1046	1656	2475
SWUAKE FEET	200	52	176	415	609	1394	2209	3300

TABLE 4-43
CURMECTION FUEL FLOW LDS/HR FOR EXTERNAL UKAG
PRESSURE: 800U FT TEMPERATUKE: 15 C
AIRCRAFT - CH-47B 225 KPM
CHINOOK

				AIR S	AIR SPEED IN KIS	N KIS		
- AMTHER	124	04	09	. 80	100	120	140	160
9480	20	12	41	96	190	326	514	767
DKA6	100	24	85	194	577		650 1028	1535
N. T. Contract	150	36	123	291	999	974	974 1542 2303	2303
SWUAKE FEEL	20n	64	164	164 387		1298	757 1298 2056	3071

TABLE 4-44

CURRECTION FUEL FLOW LBS/MR FOR EXTERNAL DRAG PRESSURE: 8000 FT TEMPERATURE: 55 C AIRCRAFT - CH-47B 225 KFM

1 200	1 42	3 40 1		AIR SI	AIR SPEED IN KIS	N KIS		
		40	69	08 .	100	120	140	160
5400	20	11	38	90	177	504	482	719
DAMS.	100	23	92	180	353	611	963	143
NA MAINTE	150	34	114	271	529	912	912 1444 2154	215
SWOAKE FEET	200	45	153	362	708	1215	708 1215 1925 2872	2872

TABLE 4-45

CURRECTION FUEL FLOW LUS/HR FOR EXTERNAL DRAG PRESSURE: 10000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 225 KPM

1		di.	OL I	AIR S	AIR SPEED IN KIS	N KTS	10 200	
	Tea	04	09	. 80	100	120	140	160
3400	20	13	51	104	202	946	553	825
DRAG	100	56	88	208	407	269	1106	1691
NT STATE	150	39	132	311	909	1045	1659	2476
SWUNKE LEE!	200	51	175	417	808	1294	2212	3301

TABLE 4-46

CORMECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 10000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-47B 225 RPM CHINOOK

		100	6	AIR SI	AIR SPEED IN KIS	N KIS		
7 3 4 4 5 5 5	No.	04	69	. 80	100	120	140	160
DUAG	20	12	T h	46	188	326	511	764
NA T	100	54	82	193	376	647	1025	1527
THE SEET	150	36	152	288	564	696	1534	2291
Saunt The	200	84	163	385	748	1621	2046	3055

TABLE 4-47

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG TEMPERATURE: 15 C 225 KPM AIRCRAFT - CH-47B
CHINOOK PKESSUKE: 10000 F1

				AIR S	SPEED IN	N KIS		
PONTAGE BED	200	0+	09	. 80	100	120	140	160
9400	ηS	11	38	06	175	505	<b>#</b> 2#	111
SARA La	100	22	92	180	645	109	026	1451
TO SOUTH	150	33	114	269	526	106	1457	2132
WOAKE FEET	200	45	152	358	869	1201	1903	2843

TABLE 4-48

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DWAG PRESSURE: 10600 FT TEMPERATURE: 55 C

AIRCHAFT - CH-47B 225 KPM

				AIR SI	AIR SPEED IN MIS	SIN N		
		40	09	. 80	100	120	140	160
2000	20	10	35	118	164	583	544	699
DRAG	100	21	7.1	168	327	564	168	1330
	150	31	107	252	164	444	1336	1994
SWUNKE FEET	200	745	142	335	959	1124	1781	2659

GROUND IDLE FUEL FLOW DATA

YLLMMOTTWATHT WTABLE 131 FAT 21HT

TABLE 4-49
GROUND IDLE FUEL FLOW
AIRCRAFI - CH-47B
CHINOUK

			PRESSU	PRESSURE ALTITUDE (FT)	IUE (FT)		
		SEA LEVEL	2000	000+	0009	8000	10000
TEMPERATURE	-25 C	1220	1164	1072	1000	932	NOR
(JEGKEPS	ე 9-	1200	1144	1052	980	216	940
CENTICEANS	15 C	1180	1124	1032	960	892	AZU
10000 NO.	35 C	1160	1104	1012	240	872	BUU

ENTRIES ARE AIRCRAFT FUEL FLOW RATES IN LBS/HK



GROSS WEIGHT LIMITS DATA

TABLES
(225 RPM)



TABLE 4-50 GROSS WEIGHT LIMITS (UUE TO ENGINE)
FOR TAKEOFF CRITERIA #1
100% OF MAXIMUM POWER (HOGE)
A1RCRAFT - CH-47B 225 RFM
CHINUOK

			PRESSU	PRESSURE ALTITUDE (FT)	10E (FT)		
		SEA LEVEL	2000	0004	0009	8000	10000
TEMPERATURE	-52 C	51395	48620	45810	42973	39827	36988
DEGKFES	2 S-	48254	45382	42240	99094	36123	33330
CENTIGRADE	15 C	43812	41028	38058	25197	32542	30042
	32 C	38554	36119	33518	91016	28674	26426

ENTRIES ARE AIRCRAFT GROSS WEIGHIS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 40,000 LBS

TABLE 4-51

GROSS WEIGHT LIMITS

(DUE TO TRANSMISSION)

FUR TANEOFF CRITCHIA #1

100% OF MAXIMUM POWER (HOGE)

AIRCRAFT - CH-47B 225 RPM

CHINOOK

			PRESSU	PRESSURE ALTITUDE (FI)	DE (FT)		
		SEA LEVEL	2000	000+	9009	6000	10000
Demot An Active 3	-25 C	41819	40934	40020	39085	38087	37035
EMPERATORE	-5 C	40877	39975	39048	28067	37034	8009E
DEGREES	15 C	39986	39073	38108	06029	36076	350/3
CENTTORADE	35 C	39146	38198	37196	26193	35205	19148

ENTRIES ARE AIRCRAFT GRUSS WEIGHTS IN LUS

STRUCTURAL GROSS WEIGHT LIMIT: #0,000 LBS

GROSS WEIGHT LIMITS (DUE TO ENGINE)

FOR TAKEOFF CRITCHIA #2

95% OF RATED POWER. VERTICAL RATE OF CLIMB 450 FIZMIN. UGE

AIRCRAFT - CH-476 225 KPM

CHINOOK

		10 P. S. S. S. S. S. S.	PRESSU	PRESSURE ALTITUDE (FT)	DE (FT)		
		SEA LEVEL	2000	4000	0009	8000	10000
Tomat of the second	-25 C	47752	45234	42667	40056	37124	34485
DE GHEES	-5 C	44881	42247	39328	36395	33619	31012
CENTICHAINE	15 C	46674	38110	35547	32682	50213	27886
CENT - GRADE	35 C	35673	33431	31023	20/87	26533	24448

ENTRIES ARE AIRCRAFT GROSS WEIGHIS IN LUS

STRUCTURAL GROSS WEIGHT LIMIT: 40,000 LBS

TABLE 4-53

GROSS WEIGHT LIMITS

(DUE TO TRANSMISSION)

FOR TAKEOFF CRITERIA #2

TRANSMISSION POWER LIMIT VERTICAL RATE OF LLIMB 450 FT/MIN. OGE

AIRCRAFT - CH-478 . 225 RFM

CHINOOK

		The state of the s	PRESSU	PRESSURE ALTITUDE (FT)	OE (FT)		CHANGE
		SEA LEVEL	2000	0004	0009	0008	10000
TEMPENATINE	-25 C	39925	39171	38360	37523	36655	35724
CAGAGE	-5 C	39121	38319	37493	36637	35721	34764
CENTICHANG	15 C	38329	37515	30072	35771	34828	33900
CENT - SUADE	35 C	37580	36750	35867	34938	34019	33096

ENTRIES ARE AIRCRAFT GRUSS WEIGHTS IN LUS

STRUCTURAL GROSS WEIGHT LIMIT: 40,000 LBS

**TABLE 4-54** 

GROSS WEIGHT LIMITS

(DUE TO ENGINE)

FOR TAKEOFF CRITEKIA #3

100% OF MAXIMUM POWER (HIGE) 225 KFM AIRCRAFT - CH-478

CHINOOK

			PRESSI	PRESSURE ALTITUDE (F [)	IDE (FT)		
		SEA LEVEL	2000	4000	9009	8000	10000
1	-25 C	57596	54492	51348	48171	94944	41464
DE GREEG	-5 C	54078	50862	4/342	43815	40484	37354
CENTIGNALIE	15 C	<b>#606#</b>	45977	42648	29441	36466	33664
SCHOOL SCHOOL	35 C	43203	40474	3/259	94/99	32131	29613

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LUS

STRUCTURAL GRUSS WEIGHT LIMIT: 40,000 LBS

TABLE 4-55
GROSS WEIGHT LIMITS
(DUE TO TRANSMISSION)
FOR TAKEOFF CRITERIA #3
100% OF MAXIMUM POWER (HIGE)
AIRCRAFT - CH-47B 225 RPM
CHINOOR

			PRESSU	PRESSURE ALTITUDE (FT)	IUE (FT)		
		SEA LEVEL	2000	4000	0009	8000	10000
TEMBEDATIBE	-25 C	46912	45901	44853	43792	42682	41517
PERMENATURE	ວ 9-	45834	44802	43755	42659	41511	40304
CENTERN	2 SI	44815	43782	42704	41573	40444	39319
CENITORADE	25 C	43864	42805	41691	40574	39467	38295

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 40,000 LBS

VELOCITY LIMITS DATA

TABLES
YLIANOTTHETHE SHARE THE BARE ZINT
(MAR 625)

VELOCITY LIMITS TABLE **TABLE 4-56** 

(INCLUDING FUEL FLOW MAIES)

PRESSURE: SEA LEVEL TEMPERATURE: -25 C

425 KFM AIRCRAFT - CH-478 CHINOOK

	TRAN
	POWER
	CONTINUOUS
0 10	

Strong.	78	LONG	NOO	CONTINUOUS	20	POWER	TRAN	TRANSMISSION	VELOC	VELOCITY NEVER
	VEL (KTS)	(Lus/ik)	(KĘŁ)	VES (LBS/AR)	VEL (KTS)	VEL L'S'HR)	VEL (KTS)	VEL LAS/HR)	VEL (KTS)	VEL F.F.
GRUSS WEIGHTS (LBS)		20 1								* # # # * # # #
20,000	103	1672	162	3671	171	8404	149	9109	163	3694
24.003	10¢	1827	159	3671	167	8404	147	9109	163	3847
28,000	115	2106	157	3671	163	8404	341	3109	163	4037
32,000	116	2246	155	3671	091	8404	241	9109	163	4209
36,400	120	2477	151	3671	157	8404	140	9109	146	3406
37,000	121	2523	150	3671	157	8404	138	5109	140	3195

**TABLE 4-57** 

VELUCITY LIMITS TABLE

(INCLUDING FUEL FLOW KAIES)

PRESSURE: SEA LEVEL TEMPERATURE: -5 C

AIRCRAFT - CH-47B 225 KPM

	100	1 M 10 M 17 M	The second second	(3)	13.50		3			
Spr png (FB)	18 78	LON6 RANGE	CON	CONTINUOUS	CENE	MAX POWER (ENGINE)	TRAN	THANSMISSION	VELOC	VELOCITY NEVER EXCEED
6/1/52	VEL (KTS)	(LBS/HK)	(KFS)	(LBS/HR)	VEL (KTS)	(LBS/HK)	VEL (KTS)	(LBS/HK)	(KTS)	(LBS/HR)
GRUSS WE 16HTS (LBS)	202	. 4. 3		10 / 10 / 10 / 10 / 10 / 10 / 10 / 10 /					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	97.73.4
20,000	106	1763	166	3532	176	5903	155	5137	163	3428
24,000	118	2004	163	3532	172	5065	153	2137	163	3543
28,000	117	209d	159	3532	168	2903	150	2137	163	3695
32,000	121	2302	157	3532	165	5903	148	5137	163	3819
36,000	125	2513	154	3532	162	3903	145	5137	146	3175
37,000	125	2556	154	3532	161	5903	144	5137	140	3000

TABLE 4-58 VELUCITY LIMITS TABLE

(INCLUDING FUEL FLOW MAIES)

PRESSURE: SEA LEVEL TEMPERATURE: 15 C

AIRCRAFT - CH-476 225 KPM

						1000				
Action Africa	R	LONG	CONT	CONTINUOUS	(ENG	MAX POWEK (ENGINE)	TRANS	TRANSMISSION LIMIIS	VELOCI	VELOCIIT NEVER
- Calebra	(KFL)	(LBS/HR)	(KFS)	(LBS/HR)	(KFS)	(LBS/HR)	(KTS)	(LBS/HK)	(KTS)	(LBS/HR)
WEIGHTS (LBS)			7.00	7 - T	299		A STATE		13 ×	1907
20,000	121	1930	161	3183	<b>#LT</b>	5609	191	3163	163	3243
24.000	121	2028	158	3183	169	6090	158	5163	163	3373
28,000	125	2154	155	3183	166	3609	154	5163	163	3507
32,000	126	2353	153	3183	163	6099	152	5163	163	3600
36,000	129	2560	150	3183	191	6090	149	3163	9#1	3051
37,000	130	2617	149	3185	160	9609	148	3163	041	5805

TABLE 4-59 VELUCITY LIMITS TABLE

(INCLUDING FUEL FLOW KAIES)
PRESSURE: SEA LEVEL TEMPERATURE: 35 C

AINCHAFT - CH-47B 225 KPM

WELST WEJSHTS WEJSHTS (LBS) 201000 124	KANGE	CONT	CONTINUOUS	20	PUWER	TRAN	TRANSMISSION	VELOCI	VELOCITY NEVER
			OWER	ENG	IME)				
0	(LES/HK)	(KFS)	(LBS/HK)	(KTS)	(LBS/HR)	(KTS)	(LBS/HK)	(KTS)	(LBS/HR)
	WHOE	3000		TE PART	1 24	200	A STATE OF	7 L	Street to the
	1961	154	2814	167	3233	165	1916	158	2940
	2058	151	2814	163	3233	162	1610	158	3049
25. 000	2201	148	2814	160	3233	159	1616	158	3147
32,600 130	5142	145	2814	158	3233	156	1616	158	3232
36,000	2630	140	2814	154	3233	153	1910	140	2815
37.000	2687	139	2814	153	5233	151	1616	135	5698

TABLE 4-60 VELUCITY LIMITS TABLE (INCLUDING FUEL FLOW MATES)

PRESSURE: 2000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-47B 225 RPM

	SE SE	LONG	CONT	CONTINUOUS	E ON P	MAX POWEK FNGINE)	TRANS	TRANSMISSION LIMI IS	VELOCI	VELOCITY NEVER
	VEL	F .F .	VEL	F.F.	VEL (KTS)	(LBS/HR)	VEL (KTS)	(LBS/HK)	VEL (KTS)	(LBSZHR)
	100	1000					2500			
GRUSS JE 16HTS	VIV			The state of the s						
								40.50	163	3461
+	104	1601	145	3534	173	3853	153	2060		
20,000	101	-002			100	404.3	150	3060	163	3695
24,000	110	1819	191	3534	100			1	163	5834
+	4::	2004	157	3534	163	5853	147	2000		
28,000		1 200	1129	26.24	16.0	5853	145	2060	163	con+
32,000	118	2200	121	1000		1	1111	3060	146	3282
36.1100	122	2439	151	3554	157	2833	-		077.	41176
	100	SEA.	1631	4534	156	3853	140	3060	2	

TABLE 4-61

VELUCITY LIMITS TABLE

(INCLUDING FUEL FLOW KAIES)

PRESSURE: 2000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-47B 225 RPM CHINUOK

				Control of the Contro	and the state of t	The state of the s	大学 一大学 一大学 一大学 一大学 一大学 一大学 一大学 一大学 一大学 一	The state of the s		
50×040	75	LONG	CONI	CONTINUOUS POWER	(ENC	MAX POWER (ENGINE)	TRAN	TRANSMISSION	VELOCI	VELOCITY NEVER EXCEED
AKONO CONTRACTOR	(KTS)	(LBS/HK)	(KĘS)	(LBS/HK)	(KTS)	(LB\$/#R)	(KTS)	(LBS/HK)	(KTS)	(LBS/HR)
GRUSS WEIGHTS (LBS)	ASP				234		46.5	3 3 6 73	AEF	
20,000	110	1680	165	3290	176	3687	159	3086	163	3217
24,000	117	1895	161	3290	172	2687	156	9806	163	3355
28,000	119	2043	158	3290	168	2687	153	9806	163	3498
32,000	124	2276	156	3290	591	2687	150	9806	163	3605
36,000	126	2453	153	3290	191	2687	Sp147	3086	146	3035
37,000	126	2506	152	3290	191	2687	146	9805	140	2882
									A CONTRACTOR OF THE PARTY OF TH	

**TABLE 4-62** 

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW KAIES)

PRESSURE: 2000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-478 225 KPM

400 7 00 2 2	32	LONG	CONT	CONTINUOUS	(ENGO	MAX POWEK (ENGINE)	TRAN	TRANSMISSION LIMI IS	VELOC	VELOCITY NEVER
	(KFS)	F.F.	(KĘS)	VES (LBS/HR)	VEL (RTS)	INTEL LUSTHRI		VEL L'F.	(KTS)	(KTS) (LBS/HR)
GRUSS IE 16mTS	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							35 U 15 U	20.5	1 6 6 2 1
20,000	121	1841	160	2945	173	5391	165	3111	157	2861
24 , 000	121	1927	156	2945	169	3391	161	3111	157	2973
28,000	125	2114	154	2945	165	5391	158	3111	157	3079
32,000	128	2300	151	2945	163	3391	155	3111	157	3175
36,000	130	2513	146	2945	160	3391	151	3111	140	2758
37.000	131	2565	145	2945	158	5391	150	9111	134	2644

TABLE 4-63

VELOCITY LIMITS TABLE

TEMPERATURE: 35 C (INCLUDING FUEL FLUW KATES) PRESSURE: 2000 FT

AIRCRAFT - CH-478 225 RPM

		The Real Property lies and the Personal Property lies and the				White Control of the				
200	78	LONG	CON	CONTINUOUS	PC	MAX POWER (ENGINE)	TRAN	TRANSMISSION LIMIIS	VELOC.	VELOCITY NEVER
	VEL (KTS)	(LBS/HK)	(KFS)	F.F. (LBS/HR)	VEL (KTS)	(LUS/HR)	VEL (KTS)	L'BS/HK)	VEL (KTS)	(LBS/HR)
GRUSS WE 16HTS (LBS)	itari malikis	VASQUE		X				TECHNON		Variation News
20,000	124	1857	152	2603	166	5037	169	3134	152	2587
24,000	125	1972	150	2603	165	5037	165	3134	152	2682
28+000	128	2140	146	2603	091	5037	162	5134	152	1772
32,000	135	2363	142	2603	157	5037	160	3134	152	2884
36,000	135	2587	136	2603	191	5037	154	3134	134	2573
37,000	135	2640	134	2603	641	5037	152	9134	129	2486

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4-64
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8
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TABLE

		-25 C		
TABLE	(INCLUDING FUEL FLOW RAIES)	TEMPERATURE: -25 C	AIRCRAFT - CH-47B 225 RPM	
VELUCITY LIMITS TABLE	FUEL FLU		CH-47B	CHINOOK
VELUCITY	NCLUDING	4000 FJ	RCRAFT -	
		PRESSURE: 4000 F1	AI	
Set-1	183			(2) (C)

A CHES WAY								さんない こうしょうしょう かんかん	S. S	
- A - C - C - C - C - C - C - C - C - C	J& (KEN)	LONG	LNOO	CONTINUOUS	(ENG	MAX POWEK (ENGINE)	TRANS	TRANSMISSION LIMIIS	VELOC	VELOCITY NEVER
	(KTS)	(LBS/HK)	(K导)	(LBS/HR)	(KTS)	(LBS/HR)	(KTS)	(LBS/HK)	(KTS)	(LBS/HR)
GRUSS WEIGHTS (LBS)								4113 NTPATON	13044k 13	958 D 17 PENSO 17 PENSO
20,000	105	1543	165	3380	7.15	1696	156	5013	163	3293
24,000	114	1806	161	3380	167	1696	153	3013	163	3477
28,000	116	1955	157	3580	163	1696	150	3013	163	3650
32,000	121	2181	154	3380	160	1696	9#1	2013	163	3813
36,000	125	2430	151	3580	157	1696	142	2013	146	3161
37,000	125	2476	150	3380	951	1696	141	SINC	140	2977

22	?
4-65	
4	1
TARI F	2
-	

CINCLUDING FUEL FLOW KAIES)

PRESSURE: 4000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-47B 225 RPM

		ONIG		240		,	-		30	
		RANGE	CONT	CONTINUOUS	(ENG	PUWER (ENGINE)	L	LIMI IS	VELUC	VELOCIII NEVER EXCEED
	VEL (KTS)	(LBS/HK)	VEL (KŢS)	F.F. (LBS/HK)	VEL (KTS)	(LBS/HR)	(KTS)	(LBS/HK)	VEL (KTS)	(LBS/HR)
GRUSS WE16HTS (LBS)						1.0		100 F 120 F 100 F	Arrec	PERTO
20,000	116	1679	164	3072	175	3440	163	3036	157	2827
24,000	117	1805	160	3072	041	0446	159	3036	157	5949
28,000	122	2009	157	3072	167	2440	156	3036	157	3063
32,000	125	2210	154	3072	163	0446	153	3036	157	3186
36,000	127	2419	149	3072	651	0446	149	3036	140	2737
37,000	129	2488	148	3072	158	0446	147	9606	134	2616

Bit I degle I set	18 18 18 18 18 18 18 18 18 18 18 18 18 1	000	.: 15 C
TABLE 4-66	VELUCIIY LIMITS TABLE	(INCLUDING FUEL FLOW KAIES)	4000 FT TEMPERATURE: 15 C
The South State	132 8234 113	1	PRESSURE: 4000 FT

CHINOOK

225 RPM

AIRCRAFT - CH-478

NAC MAN	צנ	LONG	CONT	CONTINUOUS	- a	MAX PUWER	TRAN	TRANSMISSION LIMIIS	VELOCI	VELOCITY NEVER
	18.2.7	一年 日本 日本	-	OWER	CENC	JINE)	SAM AND AND			
	VEL (KTS)	(HES/HK)	(KTS)	(LBS/HK)	VEL (KTS)	(LBS/HR)	(KTS)	(LBS/HK)	(KTS)	F.F.
GRUSS WEIGHTS (LBS)	Ċ,							· 1000年	70 Jan 1	TA SIGNE
20,000	121	1737	158	2740	172	3152	169	0906	121	2513
24,000	122	1852	155	2740	167	2125	165	ก9กร	151	2610
28,000	120	2049	152	2740	164	3152	161	0900	151	5709
32,000	130	2263	148	2740	161	3152	159	0906	151	2827
36,000	132	4442	142	2740	155	3152	153	0900	134	1252
37,000	135	2536	141	2740	153	3152	151	9060	128	2434

37.000	153	8730		TABL	TABLE 4-67					
39.000		24742		VELOCITY LIMITS TABLE	LIMITS	TABLE		Contract of the second		
25.000	DE L	6255	(III	(INCLUDING FUEL FLOW KATES)	UEL FLU	W KATES				
59,039	1.80	S PKE	SSURE:	KESSURE: 4000 FT	TEMP	TEMPERATURE:	35 C			
Salvand		7463	AIR	AIRCHAFT - CH-478	H-478	225 KPM		0300		00000
201008	10 17	73.24		5	CHINOOK					
A 144 A 144 B 10 C C 1 M 10 C C 1 M 10 C	R	LONG	CONT	CONTINUOUS	CENGO	MAX POWER (ENGINE)	TRANS	TRANSMISSION LIMIIS	VELOCI	VELOCITY NEVER
	VEL (KTS)	(LBS/HK)	(KFS)	(LBS/HK)	VEL (KTS)	(LBS/HR)	(KTS)	(LBS/HK)	(KTS)	(LBS/HR)
GRUSS WE16HTS (LBS)	E			A 1919		W. (8)	314.017	MUICCIN \$118	AFF OF	HEATH AT A
20,000	124	1758	151	2415	165	2825	173	3083	146	2268
24,000	126	1893	148	2415	191	5282	169	2083	146	2359
28,000	131	2104	144	2415	158	2825	167	3083	146	2467
32,000	134	2323	138	2415	154	2825	163	3083	146	5609
36,000	135	2539	130	2415	146	2825	154	3083	122	2268
37,000	136	2604	127	2415	144	2825	152	2083	110	2157

					Kre (d		VELOCITY NEVER	(LBS/HR)		5875	3040	3199	3350	5883	2701	
			101		101		VELOC	VEL (KTS)		157	157	157	157	140	134	
	Take?		8,800				TRANSMISSION	(LBS/HK)		2968	2968	2968	2968	2968	2968	
	To it				-52 C		TRANS	(KTS)		159	155	152	148	143	142	
			TABLE	W KAIES)	TEMPERATURE:	225 RPM	MAX POWER (ENGINE)	(LBS/HR)	19 12 CS-S	5443	5443	5443	5443	3443	5443	
	788	TABLE 4-68	THITS	JEL FLU	TEMP	CHINUOK	ENG	VEL (KTS)	Made A	172	167	163	159	155	153	
	State	Spre TABL	VELUCITY LIMITS TABLE	(INCLUDING FUEL FLOW KAIES)	14 0009	AIRCRAFT - CH	CONTINUOUS	(LBS/HK)	OF CHAIN	3181	3181	3181	3181	3181	3181	
	TREE	Chi-	01012	NI	PRESSURE: 6000 FI	A1R	CONT	(KŢS)		164	160	157	153	149	147	
16.00	C 10 % 10	57.69	1,0.10	2013	PRE.		LONG	(LBS/HK)		1510	1740	1926	2164	2341	2383	
		05.3			111		A P	(KTS)		108	115	119	125	125	125	
22,000	26+000-	25+040	\$8 dag	2000 5 42	Sayana	C CONTROL OF THE CONT			GROSS WEIGHTS (LBS)	20,000	24.000	28,000	32,000	36,000	37,000	

00 F

	- Barrer				
	13				
				U	
				TEMPEKATURE: -5	
			-		AIRCMAFT - CH-47B 225 RPM
			INCLUDING FUEL FLUW KAIES	T	3
			7	=	Œ
		VELOCITY LIMITS TABLE	4	=	5
		D	Y	4	N
		3	-	X	.v
			5	7	
	6	S	1	Ī	
	9	-	u	M	30
	4	7	1	-	7
		=	7		1
	=	_	5		İ
	<b>TABLE 4-69</b>		1		O
	=	_			
		-	3	-	
		U	=		-
		0	3	5	T
		7	-	5	S.
		3	3	9	3
			2		×
			-	••	-
			-	Æ	4
				5	
				'RESSURE: 6000 FT	
-				5	
				8	
Fee				1	
	direction of				
ol					

								The second secon		
	צל	LONG	CON	CONTINUOUS POWER	CENE	MAX POWER (ENGINE)	TRAN	TRANSMISSION	VELOC	VELOCITY NEVER
	(KTS)	(LBS/HK)	(KFS)	VEL F.F.	VEL (KTS)	VEL F.F.	(KTS)	(KTS) (LBS/HR)	VEL (KTS)	VEL F.F.
GRUSS WEIGHTS (LBS)				0	TukenOK				7	
20,000	117	1619	163	2878	173	5189	167	2991	151	2470
24+000	119	1752	159	2878	891	9189	162	2991	151	2577
28,000	124	1978	156	2878	165	3189	160	2991	151	2688
32,040	126	2166	153	2878	191	3189	156	2991	151	2818
36,000	131	2423	146	2878	155	3189	149	2991	134	2495
37,000	131	2482	145	2878	153	3189	148	1667	128	2408

TABLE 4-70

VELUCIIY LIMITS TABLE

(INCLUDING FUEL FLOW RAIES)

PRESSURE: 6000 FI TEMPERATURE: 15 C

AIRCHAFT - CH-478 225 RPM

		San								
100	'Y	LONG	CON	CONTINUOUS	(ENC	MAX POWER (ENGINE)	TRAN	TRANSMISSION	VELOC	VELOCITY NEVER
- Mense	(KTS)	(LBS/HK)	(KFS)	(LBS/HK)	(KFS)	(H#/\$q-1)	(KTS)	(LB5/HR)	(KTS)	VEL LES/HRI
WEIGHTS (LBS)		er All	*-						FILE FILE FILE FILE FILE FILE FILE FILE	1年の人は大
20,000	121	1642	157	2552	169	2920	172	3012	145	2196
24,000	124	1814	154	2552	165	2920	168	3012	145	2293
28,000	128	2005	151	2552	163	7920	166	3012	145	2406
32,000	131	2216	145	2552	158	2920	161	3012	145	2554
36,000	134	2471	138	2552	150	2920	152	3U12	119	2181
37,000	135	2550	135	2552	241	0262	150	3012	107	2090
										The state of the s

TABLE 4-71
VELUCITY LIMITS TABLE
(INCLUDING FUEL FLOW KATES)

PRESSURE: 6000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 225 RPM

	75	LONG	CON	CONTINUOUS POWER	(ENG	MAX PUWEK (ENGINE)	TRAN	TRANSMISSION LIMI IS	VELOCI	VELOCITY NEVER
	(KTS)	(LBS/HK)	(KFS)	(LBS/HK)	(SL)	(LBS/HR)	(KTS)	(LBS/HK)	(KTS)	(LBS/HR)
WE JUNTS (LBS)	1224	, 7 <sub>2</sub> 3							70 H	THE BEAUTY OF THE PERSON OF TH
20,000	124	1675	150	2260	163	2621	177	3033	140	1993
24,000	127	1837	147	2260	160	2621	174	3033	140	2090
28,000	132	2060	142	2260	156	2621	172	3033	140	2219
32,000	135	2280	134	2260	641	2621	163	2033	140	2387
36,000	136	2550	121	2260	139	7.97	152	5000	<b>ħ6</b>	2018
37,000	136	2635	116	2260	136	2621	149	5035	94	2050
		The state of the s		-						

TABLE 4-72 VELUCITY LIMITS TABLE

(INCLUDING FUEL FLOW KAIES)

PRESSURE: 8000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-47B 225 RPM

CHINOOK

	Sherrow School Section									
STATE OF THE PARTY	- A	LONG	CON	CONTINUOUS	(ENC	MAX POWEK (ENGINE)	TRAN	TRANSMISSION	VELOC	VELOCITY NEVER
	(KTS)	(LBS/HK)	(KĘS)	(LBS/HK)	(KTS)	(LBS/HR)	(KTS)	(HH/SGT)	(KTS)	(LBS/HR)
GRUSS WE 16HTS (LBS)	Property and the	2 198				4 4 4	AET	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1300	9. 4 1977 (2017)
20.000	112	1509	163	2962	170	9616	162	7262	151	2488
24,000	110	1678	159	2965	165	\$198	158	7262	151	2642
28.000	121	1903	155	2962	161	3198	154	2927	151	2790
32,000	125	2139	151	2965	157	9610	150	7262	151	5962
36,000	125	2285	145	2965	151	9118	144	2927	134	2585
37,000	125	2334	143	2965	641	9610	142	7262	128	6942
-										

100

TABLE 4-73 VELUCIIY LIMITS TABLE

(INCLUDING FUEL FLOW KAIES)
(ESSURE: 8000 F) TEMPERATURE: -5 C

PRESSURE: 6000 FT TEMPERATURE: AIRCRAFT - CH-47B 225 RPM

CHINDOK

LONG F.F. (EBS/HK) (ETS) (LBS/HK) (KTS) (K	The state of the s										
VEL       F.F.       VEL       F.F.       VEL       F.F.       VEL         (KT5)       (LBS/HK)       (KTS)       (LBS/HK)       (KTS)         117       1534       162       2684       171       2952       171         122       173       2684       166       2952       166         129       1922       155       2684       162       2952       162         129       2153       149       2684       157       2952       157         131       2399       141       2684       149       2952       149         131       2466       139       2684       149       2952       149	South S	18	ONG	CON	MAX FINUOUS SOWER	PC	AAX WEK INE)	TRAN	NOISSIMI	VELOC	VELOCITY NEVER
117 1534 162 2684 171 2952 171 122 1723 158 2684 166 2952 166 125 1922 155 2684 162 2952 162 129 2153 149 2684 157 2952 157 131 2399 141 2684 149 2952 149	5.4022	VEL (KTS)	F.F.	VEL (KŢS)	F.F. (LBS/HK)	VEL (KTS)	(LUS/HR)	VEL (KTS)	(LBS/HR)	VEL (KTS)	(LBS/HR)
117     1534     162     2684     171     2952     171       122     1723     158     2684     166     2952     166       129     1922     155     2684     162     2952     162       129     2153     149     2684     157     2952     157       131     2399     141     2684     149     2952     149       131     2466     139     2684     140     2952     149	GRUSS MEJUNTS (LBS)						1 2 <sup>17</sup>			138 6 (139)	19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
122     1723     158     2684     166     2952     166       125     1922     155     2684     162     2952     162       129     2153     149     2684     157     2952     149       131     2399     141     2684     149     2952     149       131     2466     139     2684     147     2952     149	20,000	117	1534	162	2684	171	2952	171	2948	145	2155
125     1922     155     2684     162     2952     162       129     2153     149     2684     157     2952     157       131     2399     141     2684     149     2952     149       131     2466     139     2684     147     2952     149	24,000	125	1723	158	2684	166	2622	166	2948	145	2255
129 2153 149 2684 157 2952 157 131 2399 141 2684 149 2952 149	26,000	125	1922	155	2684	162	262	162	2948	145	2378
131 2466 129 2684 149 2952 149	32,000	129	2153	149	2684	157	2952	157	2948	145	2552
131 2466 129 2684 147 2952 147	36,000	131	2399	141	2684	149	2952	149	2948	118	2136
	37,000	131	2466	139	2684	147	2622	147	2948	106	2055

TABLE 4-74

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW KAIES)

PRESSURE: 6000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-47B 225 RPM

	25	LONG	CONT	CONTINUOUS	50	POWER	TRAN	TRANSMISSION	VELOC	VELOCITY NEVER
100			_	OWER	CENG	INE)				
Por	VEL (KTS)	(LB\$/#K)	(KFS)	(LBS/HK)	(KTS)	เน็ร์ก็หม	(KTS)	(LES/HK)	(KTS)	(LBS/HR)
GROSS WEIGHTS (LBS)	Marcal S		and the second			N .		SANGRA SANGRA		
20,000	121	1566	157	2386	167	9027	176	2968	139	1922
24,000	126	1758	153	2386	164	9022	173	2968	139	2028
28,000	130	1970	149	2586	161	2706	170	2968	139	2165
32,000	135	2193	142	2386	153	2706	191	2968	139	2336
36,000	134	2496	130	2386	143	9022	151	2968	90	1962
37,000	135	2596	125	2336	139	2706	147	2968	81	2000

TABLE 4-75

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW KAIES)

PRESSURE: 8000 FT TEMPERATURE: 55 C AIRCRAFT - CH-47B 225 RPM

CHINOCK

S S	72 	LONG	CON	CONTINUOUS	(E.P.	MAX POWEK (ENGINE)	TRAN	TRANSMISSION	VELOCI	VELOCITY NEVER
	(KTS)	(LBS/HK)	(KĘS)	(LBS/HK)	VEL (KTS)	(LBS/HK)	(KTS)	(LBS/HK)	(KTS)	(LBS/HR)
GRUSS WEIGHTS (LBS)	And the second			E STATE					13V 13V	1 (64 J
20,000	125	1604	149	2102	162	2430	182	2987	139	1857
24,000	131	1805	145	2102	159	24.50	180	2987	139	1966
28,000	134	2024	138	2102	153	2430	175	1862	139	5115
32,000	136	2253	128	2102	143	Och2	161	2987	139	2322
36,000	135	2616	102	2102	127	neha	149	2987	0	>
37,000	135	2734	46	2102	121	5430	144	2987	0	•

TABLE 4-76 VELOCIIY LIMITS TABLE

PRESSURE: 10600 FT TEMPERATURE: -25 C AIRCRAFT - CH-47B 225 RPM

(INCLUDING FUEL FLOW KAIES)

					With the second second second second					
		LONG	CON	CONTINUOUS	CENE	MAX POWEK (ENGINE)	TRAN	TRANSMISSION LIMI IS	VELOC	VELOCITY NEVER
Sections	(KTS)	VEL F.F.	(KFS)	(LB\$/#K)	(KTS)	VEL LESTHR)	(KTS)	(LBS/HK)	(KTS)	(KTS) (LBS/HR)
GRUSS WEIGHTS (LBS)	AST					1 7/4 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	YZY	* 7× 7	1 / S V	
20,000	115	1472	161	2752	168	2980	165	2888	145	2155
24,000	119	1691	157	2752	163	2980	161	2888	145	2290
26,000	124	1892	150	2752	158	2980	154	*2888	541	2942
32,000	125	2056	148	2752	154	2980	151	8882	145	2666
36,000	124	2312	140	2752	146	2980	143	2888	118	2165
37,000	124	2386	137	2752	143	2980	141	2888	106	2002

TABLE 4-77

VELUCITY LIMITS TABLE

(INCLUDING FUEL FLOW MAIES)
PRESSURE: 10000 FT TEMPERATURE: -5 C

AIRCHAFT - CH-478 225 RPM

LONG CONTINUOUS (ENG- VEL (KTS) (LBS/HK) (KTS) 118 1472 160 2486 169 124 1696 157 2486 169 131 2145 145 2486 160 132 2435 134 2486 142	The state of the s			The second second		
VEL (KTS) (LBS/HK) (KTS) (LBS/HK) (KTS)  114 1472 160 2486 169  124 1696 157 2486 160  127 1886 153 2486 160  131 2145 145 2486 152  132 2435 134 2486 152	S	AX WEK INE)	TRANS	TRANSMISSION	VELOCI	VELOCITY NEVER EXCEED
114 1472 160 2486 169 124 1696 157 2486 165 127 1866 153 2486 160 131 2145 145 2486 152 132 2435 134 2486 142	(LBS/HK)	(LBS/HR)	VEL (KTS)	(LBS/HK)	(KTS)	F.F.
114 1472 160 2486 169 124 1696 157 2486 165 127 1886 153 2486 160 131 2145 145 2486 152 132 2435 134 2486 142	ASTOR & The Total ASTOR	. 34.7	AET.		AFF	
124     1696     157     2486     165       127     1866     153     2486     160       131     2145     145     2486     152       132     2435     134     2486     142	2486	2729	174	2907	139	1882
127     1866     153     2486     160       131     2145     145     2486     152       132     2435     134     2486     142	2486	67.23	171	2907	139	c661
131 2145 145 2486 152 132 2435 134 2486 142	2486	6272	166	2907	139	2137
132 2435 134 2486 142	5486	2729	157	2907	139	1252
020 020 020	2486	6275	147	2907	88	1922
7.480	130 2486 138	2729	144	2907	0	0

TABLE 4-78 VELOCIIY LAMITS TABLE

(INCLUDING FUEL FLOW RAIES)

PRESSURE: 10000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-478 225 KPM

VEL (KTS) (LBS/HK) (LBS/HK) (KTS) (LBS/HK) (LBS/HK) (KTS) (LBS/HK) (KTS) (LBS/HK) (LBS/HK) (KTS) (LBS/HK) (LBS/H		Ĭ.	ONG	The Second	MAX	2	IAX	TRAN	NOISSIMS	VELOCI	VELOCITY NEVER
VEL (KTS)       (LES/HK)       (KTS)       (LES/HK)       (KTS)       (LES/HK)       (KTS)         123       1520       155       2209       166       2504       181         124       1719       151       2209       163       2504       179         131       1931       145       2209       147       2504       173         134       2205       115       2209       131       2504       160         135       2595       115       2209       131       2504       146         134       2696       1,7       2209       125       2504       142		œ	ANGE	CONT	INDOUS	(ENG	WER INE)	<u>,</u>	SITWI		xceen
125 1520 155 2209 166 2504 181 128 1719 151 2209 163 2504 179 131 1931 145 2209 157 2504 173 134 2205 135 2209 147 2504 160 135 2595 115 2209 131 2504 142		(KFS)	(LBS/HK)	(KFS)	(LBS/HK)	VEL (K1S)	(LBS/HR)	(KTS)	(LBS/HK)	(KTS)	(LBS/HR)
123     1520     155     2209     166     2504     181       124     1719     151     2209     163     2504     179       131     1931     145     2209     167     2504     173       134     2205     135     2209     147     2504     160       135     2595     115     2209     131     2504     146       134     2696     1,7     2209     125     2504     142	GRUSS WEIGHTS (LBS)	137	* H . 8		* A		4 4 7	VET		1.00	
128     1719     151     2209     163     2504     179       131     1931     145     2209     157     2504     173       134     2205     135     2209     147     2504     160       135     2595     115     2209     131     2504     146       134     2696     1,7     2209     125     2504     142	20,000	125	1520	155	2209	166	2504	181	2925	134	1708
131     1931     145     2209     157     2504     173       134     2205     135     2209     147     2504     160       135     2595     115     2209     131     2504     146       134     2696     1 <sub>1</sub> 7     2209     125     2504     142	24,000	128	1719	151	2209	163	2504	179	2925	134	1827
134         2205         135         2209         147         2504         160           135         2595         115         2209         131         2504         146           134         2696         1,7         2209         125         2504         142	28,000	131	1931	145	5209	157	2504	173	2925	134	1984
135     2595     115     2209     131     2504     146       134     2698     1 <sub>1</sub> ,7     2209     125     2504     142	32,000	134	2205	135	2209	147	2504	160	2925	134	2192
134 2698 1,7 2209 125 25u4 142	36 • 000	135	2595	115	5509	131	2504	146	2925	0	2
	37,000	134	2698	1,7	5209	125	2504	142	2925	0	•

TABLE 4-79
VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)

PRESSURE: 10000 PT TEMPERATURE: 35 C

AINCHAFT - CH-47B 225 RPM

					-					
0.000	75	LONG	CONI	CONTINUOUS POWER	PDC	MAX POWER (ENGINE)	TRAN	TRANSM15510N Limiis	VELOC	VELOCITY NEVER
PERSON	(KTS)	(LES/HK)	(KFS)	(LBS/HK)	(KTS)	(Las/ink)	(KTS)	(LBS/HK)	VEL (KTS)	(LBS/HR)
GRUSS WE JUNTS (LBS)	122			2 T	10833 y		55.5	ia ia	38V	1871 X 2
20.000	127	1546	148	1952	160	5246	188	2943	102	1281
24.000	132	1766	143	1952	156	5246	187	2943	102	1426
28,000	135	1984	134	1952	148	2246	174	2943	102	1598
32,000	136	2284	116	1952	134	2246	159	2943	705	1839
36,000	134	2721	0.3904	1952	108	5546	142	2943	0	n
37,000	132	2813	0	1952	91	2246	137	2943	0	0

## CHAPTER 5

## CHINOOK (CH-47B) PERFORMANCE DATA TABLES (230 RPM)

## GENERAL

These tables are the additional ones needed when the CH-47B is operated at a gross weight in excess of 37,000 lbs. These are for 230 RPM engine usage and are supplemental to the tables in Chapter 4. The tables are organized in the following manner:

Tables 5-1 to 5-24

Tables 5-25 to 5-48

Table 5-49

Table 5-50 to 5-55

Tables 5-56 to 5-79 Velo

Basic Fuel Flow Data

Delta Fuel Flow for Drag Data

Ground Idle Fuel Flow Data

Gross Weight Limits Data

Velocity Limits Data

BASIC FUEL FLOW DATA

TABLES
(230 RPM)

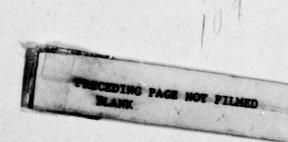


TABLE 5-1

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: SEA LEVEL TEMPERATURE: -25 C

AIRCRAFT - CH-478 230 RPM

CHINOOK

GROSS				FLIG	HT MOD	FLIGHT MODE (KTS)	15 15 40 35	2596		11600
(LBS)	HIGE	HIGE HOGE NOE	NOE		09	80	001	40 60 80 100 120 140 160	140	160
37,000	2512	2770	2539	2512 2770 2539 2309 2067 2035 2167 2551 3282 4397	2067	2035	2167	1557	3282	4397
38,000	2572	2839	2600	2572 2839 2600 2360 2110 2075 2206 2587 3323 4444	2110	2075	2206	2587	3323	***
39,000	2631	2909	1992	2631 2909 2661 2412 2154 2116 2244 2624 3365 4490	2154	2116	2244	2624	3365	0644
40.000	1692	2691 2983 2724 2466 2199 2157 2284 2662 3409 4538	2724	2466	2199	2,57	2284	2992	3409	4538

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TABLE 5-3

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR PRESSURE: SEA LEVEL TEMPERATURE: 15 C

AIRCRAFT - CH-478 230 RPH CHINOOK

GROSS	(B) (C) (C) (C) (C) (C) (C) (C) (C) (C) (C			FLIG	FLIGHT MODE (KTS)	E (KTS	5 % 3 7			37.30
(L85)	HIGE	HOGE	NOE	40	09	80	001		120 140	160
37,000	1292	2925	5666	2666 2408 2144 2070 2143	2144	2070	2143	2409	2918	3637
000 18	2685	3005	2736	3005 2736 2466 2193 2112 2184	2193	2112	2184	2446	2956	3667
000 61	1575		2807	3087 2807 2527 2244 2156 2225	2244	2156	2225	2485	2994	3702
40.000	2819	3171	2880	2819 3171 2880 2590 2295 2200 2268	2295	2200	2268		2525 3034 3741	3741

TABLE 5-4

BASIC FUEL FLOW
FUEL FLOW RATES.FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: SEA LEVEL TEMPERATURE: 35 C

AIRCRAFT - CH-478 230 RPM

CHINDOK

GROSS	2814	3141	2980	FL16	FLIGHT MODE (KTS)	E (KTS	3 S W U		1000	200
(LBS)	HIGE	HOGE	NOE	40	09	80	1 00	120	120 140	160
37,000	2680	1106	2740	2470	2196	2,04	2740 2470 2196 2104 2160	2390	2848	3484
38,000	2750	3096	2814	2533	2248	2148	2814 2533 2248 2148 2202	2429	2888	3525
39,000	2823	3181	3181 2890 2598	2598	2300	2193	2300 2193 2246 2469 2929	2469	2929	3573
40,000	2898	1	2967	2665	2352	2239	3270 2967 2665 2352 2239 2291	2509	2972	3430

TABLE 5-5

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR PRESSURE: 2000 FT TEMPERATURE: -25 C BASIC FUEL FLOW AIRCRAFT - CH-478

CHINDOK

230 RPM

GROSS	30.76	N. C.	E 10 10 10 10 10 10 10 10 10 10 10 10 10	FLIG	FLIGHT MODE (KTS)	E (KTS	35 % W			
(188)	HIGE	HOGE	NOE	40		80	100	60 80 100 120 140 160	1 40	160
37,000	2490	2759	2521	2283	2490 2759 2521 2283 2036 1998 2116 2468 3161 4210	1998	2116	2468	3161	4210
38,000	2549	2835	2586	2338	2586 2338 2082 2040 2157 2507 3208 4258	2040	2157	2507	3208	4258
39,000	2608	2913	2654	2394	2608 2913 2654 2394 2130 2082 2199 2547 3257 4307	2082	2199	2547	3257	4307
40.000	2668	2993	2723	2453	2668 2993 2723 2453 2179 2126 2243 2587 3307 4359	2126	2243	2587	3307	4159

TABLE 5-6

FUEL FLOW RATES. FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 2000 FT TEMPERATURE: -5 C
AIRCRAFT - CH-47B 230 RPM

CHINDOK

GROSS	2443	2000		FL16	FLIGHT MODE (KTS)	E (KTS	2543		1361	
(182)	HIGE	HIGE HOGE	NOE	40	F 7 3	08 09	100	100 120 140 160	140	160
37,000	2546	2843	2546 2843 2588 2333 2074 2009 2096 2381	2333	2074	2009	2096	2381	2913 3748	3748
38,000	2609	2925	2925 2659 2393 2123 2053 2138	2393	2123	2053	2138	2422 2953 3788	2953	3786
39.000	2673	3006	2673 3009 2732 2455 2174 2096 2180 2463 2995 3832	2455	2174	2096	2180	2463	2995	383
40,000	2739	3094	2807	2519	2739 3094 2807 2519 2225 2141 2224 2506 3039 3882	1415	2224	2506	3039	3882

TABLE 5-7

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 2000 FT TEMPERATURE: 15 C
AIRCRAFT - CH-478 230 RPM

3		í	•
	ÿ	-	i
	Ŋ,	Ŀ	ı
1		3	١
	-		
	d	3	6
	•	Ü	
		t	•
-	ī	7	Ξ
В,	Ł	4	,

GROSS	3408			FLIG	HT MOD	FLIGHT MODE (KTS)	•		0.000	
(185)	HIGE	HIGE HOGE	NOE	40	09	80	1 00	120	100 120 140	160
37.000	2608	2632	2664	2396	2124	2664 2396 2124 2037 2100 2340 2813	2100	2340	2813	3471
38,000	2678	3018	2739	2460	2175	2678 3018 2739 2460 2175 2081 2144 2381	2144	2381	2854	2854 3515
39,000	2749	3107	2817	2527	2227	2749 3107 2817 2527 2227 2127 2188 2423 2896	2188	2423	2896	3585
40.000	1282	3198	2821 3198 2896 2595	2595	2280	2280 2173 2234 2466 2940 3648	2234	2466	2940	3648

TABLE 5-8

BASIC FUEL FLOW FUEL FLOW FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 2000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-47B 230 RPM

CHINDOK

GROSS	ere i			FLIG	FLIGHT HODE (KTS)	E (KTS				
(185)	HIGE	HIGE HOGE NOE	NOE		09	80	40 60 80 100 120 140	120	140	160
37,000	2680	3023	2744	2465	2177	2073	2680 3023 2744 2465 2177 2073 2122 2325 2755 3364	2325	2755	3364
38,000	2755	3114	2824	2534	2230	2119	2755 3114 2824 2534 2230 2119 2168 2366 2798 3427	2366	2798	3427
39,000	2832	3209	2907	2605	2283	2167	2832 3209 2907 2605 2283 2167 2217 2410 2846 3500	2410	2846	3500
40,000	2908	3308	2993	2678	2338	2216	2908 3308 2993 2678 2338 2216 2267 2458 2896 3581	2458	2896	3581

TABLE 5-9

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR PRESSURE: 4000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 230 RPM

GROSS				FLIG	FLIGHT MODE (KTS)	E (KTS	7.			
(188)	HIGE	HOGE	NOE		9	80	100	40 60 80 100 120 140 160	140	160
37,000	5469	2768	2518	2269	2016	1968	2076	2269 2016 1968 2076 2397	3064	4040
38,000	1652		2849 2589		2067	2012	2120	2329 2067 2012 2120 2438 3116 4094	3116	4004
39.000	2595	2632	2660 2389 2119 2058 2166	2389	2119	2058	2166	2481 3171 4153	3171	4153
40.000	2663	3017	3017 2734 2450 2173 2104 2212 2550 3227	2450	2173	2104	2212	2550	3227	4218

TABLE 5-10

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR TEMPERATURE: -5 C BASIC FUEL FLOW PRESSURE: 4000 FT

230 RPM AIRCRAFT - CH-478

3	
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C	)
2	Z
3	C

GROSS				FLIG	FLIGHT MODE (KTS)	E (KTS				
(LBS)	HIGE	HIGE HOGE NOE	NOE	0#	09	08 09	100	100 120	140 160	160
37,000	2534	1987	2595	2330	2595 2330 2059 1982 2059	1982	2059	1282	2816	3598
38.000	2602	2602 2947 2671 2394 2112 2027 2104 2364 2890 3654	1792	2394	2112	2027	2104	2364	2890	3654
39,000	2673	3035 2747 2460 2165 2073 2150 2407 2939 3717	2747	2460	5912	2073	2150	2407	2939	37.17
40,000	2748	2748 3126 2826 2526 2220 2120 2199 2451 2990 3791	2826	2526	2220	2,20	2199	2451	2990	3791

TABLE 5-11

BASIC FUEL FLOW

FUEL FLOW RATES' FOR THE GIVEN CONDITIONS IN LBS/HR

PRESSURE: 4000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-478 230 RPM

GROSS				FLIG	HT MOD	FLIGHT MODE (KTS)			0.00	
(L85)	H I GE	HIGE HOGE NOE 40 60 80 100 120 140 160	NOE	40	09	90	1 00	120	140	1 60
37,000	2610	2610 2956 2678 2400 2110 2011 2068 2283 2723 3378	2678	2400	2110	2011	2068	2283	2723	3378
38,000	2683	2683 3048 2759 2469 2163 2058 2116 2328 2769 3449	2759	2469	2163	2058	2116	2328	2769	3449
39,000	2759	2759 3143 2841 2539 2218 2106 2165 2375 2820 3528	2841	2539	2218	2106	2165	2375	2820	3528
40.000	2838	2838 3242 2926 2610 2275 2156 2219 2426 2876 3416	2926	2610	2275	2156	2219	2426	2876	3416

TABLE 5-12

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 4000 FT TEMPERATURE: 35 C
AIRCRAFT - CH-478 230 RPM

GROSS				FLIG	FLIGHT MODE (KTS)	E (KTS	1 5 7 1 0	0.6.9.6	20世纪 1000	
WEIGHTS (LBS)	HIGE	HIGE HOGE NOE	NOE	40	09	80	1 00	40 60 80 100 120 140 160	1 40	160
37,000	2690	2690 3057 2766 2476 2163 2051 2098 2275 2682 3314	2766	2476	2163	2051	2098	2275	2682	3314
38,000	2767	3157	1882	2550	2220	2012	1512	3157 2854 2550 2220 2102 2151 2328	2738 3401	3401
39,000	2847	2847 3260 2943 2626 2281 2155 2207 2389	2943	2626	1822	2155	2207	2389	2803 3495	3495
40.000	2930	2930 3365 3034 2703 2345 2211 2268 2458 2879 3595	3034	2703	2145	2211	2268	2458	2879	3595

TABLE 5-13

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR PRESSURE: 6000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 230 RPH

GROSS		, , , , , , , , , , , , , , , , , , ,	1388	FLIG	FLIGHT MODE (KTS)	E (KTS	255		26.44	343.8
(183)	HIGE	HIGE HOGE NOE	NOE	40		80	60 80 100 120 140 160	120	140	160
37,000	2463	2790	2528	2266	2463 2790 2528 2266 2010 1947 2047 2337 2988 3906	1947	2047	2337	2988	3906
36,000	2532	2876	2603	2330	2532 2876 2603 2330 2064 1995 2095 2411 3046 3976	1995	2095	2411	3046	3976
39,000	2604	2964	2680	2395	2604 2964 2680 2395 2119 2043 2143 2463 3106 4055	2043	2143	2463	3106	4055
40,000	2677	3054	2759	2464	2677 3054 2759 2464 2173 2093 2192 2515 3168 4144	2093	2192	2515	3168	41.4

TABLE 5-14

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR PRESSURE: 6000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-478 230 RPM

GROSS		Mark Control		FLIG	FLIGHT MODE (KTS)	E (KTS			0.00	To the same of the
(LBS)	391H	HIGE HOGE	NOE	0%		80	100	60 80 100 120 140 160	140	160
37,000	1452	2890	2613	2890 2613 2336 2053 1962 2035 2269	2053	1962	2035	2269	2768	2768 3508
38,000	2617	2617 2982 2693	2693	2403 2108 2011 2085 2314 2822 3590	2108	1102	2085	2314	2822	3590
39,000	2694	3078	2776	2694 3078 2776 2474 2165 2061 2138 2362 2880 3681	2165	2061	2138	2362	2880	3681
40.000	2772	317	2862	2772 3177 2862 2547 2222 2114 2192 2414 2944 3779	2222	2114	2192	2414	2944	3779

TABLE 5-15

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 6000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-478 230 RPH

GROSS	200		5	FLIG	FLIGHT MODE (KTS)	E (KTS	P. C.	2635	1926	2845
(LBS)	HIGE	HOGE	HIGE HOGE NOE	(Dr	9	80	100	40 60 80 100 120 140 160	140	160
37,000	2624	2662	2705	2414	2104	1995	202	2624 2997 2705 2414 2104 1995 2052 2244 2661 3344	2661	3344
38,000	2705	3098	2792	2486	2164	2048	2108	3098 2792 2486 2164 2048 2108 2301 2724	2724	3438
39,000	2786	3202	2882	2952	2226	2104	2168	2786 3202 2882 2562 2226 2104 2168 2363 2795 3539	2795	3539
40,000	2870	3307	2975	2642	2292	2,63	2232	2870 3307 2975 2642 2292 2163 2232 2434 2876 3646	2876	3646

TABLE 5-16

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 6000 FT TEMPERATURE: 35 C
AIRCRAFT - CH-47B 230 RPM

GROSS	0			FLIG	HT MOD	FLIGHT MODE (KTS)	222			
(LBS)	HIGE	HOGE	NOE	40	40 60	80	100		120 140	160
37,000	2709		3110 2805	- characteristics	2168	2499 2168 2045	2097	2272	2992	3324
38.000	2795		2897	2578	2236	2105	3216 2897 2578 2236 2105 2162 2349 2750 3429	2349	2750	3429
39,000	2884	3323	2993	2992	2309	2169	2884 3323 2993 2662 2309 2169 2232 2434 2849 3544	2434	2849	3544
40.000	2974	3434	3093	2753	2384	2237	2974 3434 3093 2753 2384 2237 2304 2525 2958 3672	2525	2958	3672

**TABLE 5-17** 

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 8000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 230 RPM

GROSS	ODA &	0 1 2 2 2	100   100   100	FLIG	FLIGHT MODE (KTS)	E (KTS	8025			
(188)	HIGE	HOGE	NOE	40	09	80	100	120	1 40	160
37,000	2476	2824	1552	2278	2010	1936	2028	2327	2931	3834
38,000	1552	2551 2916 2632 2348 2064 1986 2079 2382	2632	2348	2064	1986	2079	2382	2996 3932	3932
39,000	2628	3012	2716	2420	2119	2037	2131	2439 3065 4040	3065	4040
40.000	2707	2707 3111 2802 2493 2177 2n87 2187 2501 3140 4156	2802	2493	2177	2087	2187	2501	3140	4156

TABLE 5-18

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR PRESSURE: 8000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-47B 230 RPM CHINOOK

GROSS				FLIG	HT MOD	FLIGHT MODE (KTS)	18 1 8 2		0.00	0 R 1 R
(L85)	HIGE	HIGE HOGE	NOE	ş		90 100	1 00	120	120 140	160
37,000	2564	2937		2355	2055	2646 2355 2055 1956 2027	2027	2233	2233 2724 3495	3495
38,000	5644	3039 2735 2431 2115 2010 2085 2291 2795 3601	2735	2431	2115	2010	2085	1622	2795	3601
39.000	2725	2725 3143 2826 2508 2176 2068 2145 2358 2875 3714	2826	2508	2176	2068	2145	2358	2875	3714
40.000	2809	2809 3248 2918 2588 2241 2127 2208 2434 2968 3833	2918	2588	2241	2127	2208	2434	2968	3833

TABI F 5-19

BASIC FUEL FLOW
FUEL FLOW RATES POR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 84000 FT TEMPERATURE: 15 C
AIRCRAFT - CH-478 230 RPM

GROSS	200	3609	100	FLIG	FLIGHT MODE (KTS)	E (KTS	1351	171 171 10 10	2153	66 18 35 (19
(LBS)	HIGE	HIGE HOGE NOE	NOE	SS-22-10	09	80	100	40 60 80 100 120 140 160	140	160
37,000	2653	3057	2750	2653 3057 2750 2443 2119 2001 2064 2250 2660 3371	2119	2001	2064	2250	2660	3371
38,000	2740	3163	2845	2740 3163 2845 2526 2188 2063 2132 2329 2752 3484	2188	2063	2132	2329	2752	3484
39,000	2829	3271	2942	2829 3271 2942 2613 2259 2129 2201 2418 2857 3609	2259	2129	1022	2418	2857	3609
40.000	2920	3383	3044	2920 3383 3044 2705 2335 2197 2273 2516 2972 3747	2335	2197	2273	2516	2972	3747

TABLE 5-20

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 8000 FT TEMPERATURE: 35 C
AIRCRAFT - CH-47B 230 RPM

GROSS				FLIG	FLIGHT MODE (KTS)	E (KTS	5533	40 40 \$0		
WEIGHTS (LBS)	HIGE	HOGE	NOE	06	09	90 80	100	120	140	160
37,000	2749	4218	2860	2545	2204 2068 2130	2068	2130	2333	2733	3394
38,000	2842	3290	2966	2642	2283 2139 2205	2139	2205	2430	2853	3513
39,000	2935	3410	3078	2746	2365 2212 2280 2534 2983	2122	2280	2534	2983	3674
40.000	3030	3534	3197	2859	2859 2451 2288 2357 2643 3122	2288	2357	2643	3122	3858

TABLE 5-21

FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR PRESSURE: 10000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 230 RPM

CHINDOK

GROSS	0000	3333	\$3.30	FLIG	FLIGHT MODE (KTS)	E (KTS	0683			2000
(182)	HIGE	HIGE HOGE	NOE	40	40 60 80 800 120 140 160	980	₩00	120	140	160
37,000	2503	2503 2877 2591	2591	2305	2305 2013 1931 2023 2313 2904 3843	1691	2023	2313	2904	3843
38,000	2583	2979	2680	2381	2583 2979 2680 2381 2074 1985 2083 2382	1985	2083	2382	2987 3967	3967
39,000	2665	3084	2772	2459	2665 3084 2772 2459 2138 2043	2043	2146	2146 2459 3080 4098	3080	4098
40,000	2749	2749 3189 2865 2540 2206 2105 2214 2545 3185 4236	2865	2540	2206	2,05	2214	2545	3185	4236

TABLE 5-22

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 10000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-478 230 RPH CHINOOK

GROSS	2340	183	4	FLIG	FLIGHT MODE (KTS)	E (KTS	8844			
(188)	HIGE	HIGE HOGE	NOE	0.6	09		1 00	120	80 100 120 140	160
37,000	2598	2598 3004 2699	2699	2393	2393 2072 1967 2042 2251	1961	2045	2251	4472	3545
38,000	2685	2685 3110 2794	2794	2477	2112	2029	2110	2336	2849	3672
39.000	2774	2774 3219 2893	2893	2566 2217		2095 2183	2183	2428	2965	3810
40,000	2866	2866 3333 2996 2660 2296 2:65 2260 2552 3092 3964	2996	2660	2294	2,65	2260	2552	3002	306

TABLE 5-23

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 10000 FT TEMPERATURE: 15 C
AIRCRAFT - CH-47B 230 RPM

	4	
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GROSS				FLIG	HT MOD	FLIGHT MODE (KTS)			6	
(188)	HIGE	HOGE	NOE		09	40 60 80	1 00	120	100 120 140	160
37,000	2700	3129	2815	1052	2159	3129 2815 2501 2159 2032	2012	2326	2326 2748 3464	3464
38,000	2793	3246	2924	1092	2240	2102	3246 2924 2601 2240 2102 2177 2428 2887 3620	2428	2887	3620
39,000	2887	3369	3039	2709	2327	2176	2887 3369 3039 2709 2327 2176 2255	2535	3025 3798	3798
40.000	2982	3494	3160	2826	2417	2254	2982 3494 3160 2826 2417 2254 2336 2646 3172 4000	2646	3172	4000

**TABLE 5-24** 

BASIC FUEL FLOW
FUEL FLOW RATES FOR THE GIVEN CONDITIONS IN LBS/HR
PRESSURE: 10000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 230 RPM CHINOOK

GROSS	395		3 / S	FLIG	HT MOD	FLIGHT MODE (KTS)		6 0	5	000
(LBS)	HIGE	HIGE HOGE	NOE	40		80	60 80 100 120 140 160	120	140	160
37,000	2802	3268	2956	3268 2956 2644 2267 2116 2179 2443 2886 3566	2267	2116	2179	2443	2886	3566
36,000	2899	2899 3394 3080 2765 2359 2193 2257 2554	3080	2765	2359	2193	2257	2554	3034	3772
39,000	3000	3522	3209	3522 3209 2895 2456 2274 2338 2669 3191 3999	2456	2274	2338	2669	3191	3999
40+000	3106	3106 3651 3341 3031 2555 2360 2421 2787 3354 4944	3341	3031	2555	2360	2421	2787	3354	4944

DELTA FUEL FLOW FOR DRAG DATA

TABLES

(230 RPM)

**TABLE 5-25** 

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: SEA LEVEL TEMPERATURE: -25 C AIRCRAFT - CH-47B 230 RPM CHINOOK

				AIR	AIR SPEED IN KTS	IN KT	S	
	200	\$	09	80	100	120	140	190
1333 185100	50	19	63	150	296	504	908	1201
DRAG	100	38	127	301	165	101	1609	2402
2	150	57	190	454	882	8151	2413	3602
SQUAKE FEET	200	7.6	254	909	1175	1175 2024	3218	4803



**TABLE 5-26** 

CORRECTION FUE, FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: SEA LEVEL TEMPERATURE: -5 C AIRCRAFT - CH-47B 230 RPM

				AIR	AIR SPEED IN KTS	IN KT	2	
		ş	09	80	100	120	140	160
Had state and st	90	1.7	59	140	272	471	942	1111
DRAG	100	35	118	279	548	046	1490	2222
200	150	53	176	414	918	1408	1408 2234	3334
SQUARE FEET	200	7.0	235	195	1088	1877	2979	4445

**TABLE 5-27** 

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: SEA LEVEL TEMPERATURE: 15 C

CHINDOK

230 RPM

AIRCRAFT - CH-478

				AIR	SPEED	AIR SPEED IN KTS	. s	
		0.4	09	80	100	120	140	160
13.33	20	91	55	131	253	442	689	1035
פאאפ	001	3.2	110	260	808	875	1383	2069
NI TO STORY	051	64	164	389	492	1312	2075	3103
SWOARE FEET	200	59	219	125	1012	1748	2768	4137

**TABLE 5-28** 

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: SEA LEVEL TEMPERATURE: 35 C AIRCRAFT - CH-47B 230 RPM

				AIR	SPEED	SPEED IN KTS	S.	
		9.6	09	90	100	120	140	091
大连3号 经为人的复数	05	51	52	771	238	412	949	196
DRAG	001	30	103	544	475	818	1293	1934
N. Sarino	150	5 h	154	598.	715	1221	1641	2900
SWUAME FEET	200	19	205	984	950	1635	2589	3867

TABLE 5-29

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 2000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-47B 230 RPM

				AIR	SPEED	SPEED IN KTS	S	
	A Charles	40	09	80	100	120	140	160
Fass Surves	05	81	65	140	277	694	748	1116
2 2	100	36	118	282	247	939	1496	2233
Taga Bellos	150	53	178	424	821	1410	2244	3349
Secure Fee	200	11	238	295	1093	1881	2992	9966

TARI F 5-30

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 200n FT TEMPERATURE: -5 C

AIRCRAFT - CH-478 230 RPH

				AIR	SPEED	AIR SPEED IN KTS	S	
		40	09	80	100	120	1 40	160
一	90	11	54	129	255	435	693	1033
DKAG.	100	33	109	259	510	118	1385	2066
17 M 18 M	051	05	164	168	758	1307	2077	3099
SAUANE PEET	200	99	219	522	1012	1743	2769	4132

TABLE 5-31

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 2000 FT TEMPERATURE: 15 C AIRCRAFT - CH-478 230 RPM

CHINDOK

				AIR	SPEED	AIR SPEED IN KTS	S	
		9	09	80	100	120	140	160
· · · · · · · · · · · · · · · · · · ·	05	15	5.1	120	235	410	444	196
DRAG	100	31	101	142	474	814	1288	1923
2	150	94	152	362	707	1219	1932	2884
SHUARE FEE!	200	19	203	485	166	1625	2576	3845

TABLE 5-32

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 200 FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 230 RPM

				AIR	SPEED	SPEED IN KTS	S	
		40	09	80	100	120	140	160
1307 386402	90	+1	47	113	219	385	665	668
DRAG	100	58	96	225	443	192	1201	1798
8: 1 Z:1	150	64	142	338	664	1140	1804	2697
SQUARE FEET	200	25	190	654	880	1520	2406	9658

TABLE 5-33

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: .4000 FT TEMPERATURE: -25 C AIRCRAFT - CH-478 230 RPM

				AIR	AIR SPEED IN KTS	IN KT	5	
		40	09	80	100	120	140	160
2400	05	91	95	132	957	437	569	1037
2 2	100	3.2	112	492	905	874	1389	2074
Sollabe reer	150	8 #	167	868	092	1161	4802	311
SEVANE FEET	200	69	223	520	1013	6421	2778	4147

TABLE 5-34

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 4000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-478 230 RPM

				AIR	SPEED	AIR SPEED IN KTS	5	
		40	09	80	100	120	140	160
San Bernar	50	- 15	5.1	121	239	402	643	959
DRAG	100	30	103	243	471	807	1285	1919
\$ 1.50 m	150	45	551	365	705	1212	1928	2878
SQUARE FEET	200	09	206	484	939	1617	2571	3838

TARI F 5-35

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 4000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-478 230 RPM CHINOOK

				AIR	SPEED	AIR SPEED IN KTS	S.	
		40	09	80	100	120	140	160
13.17 38.495	90	1.4	48	112	221	376	899	893
DRAG	100	28	95	225	1 2 2	753	1197	1786
2	150	42	144	339	959	1130	1795	2679
SHUAKE FEET	200	95	192	452	875		1507 2394	3571

TABLE 5-36

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 4U00 FT TEMPERATURE: 35 C AIRCRAFT - CH-47B 230 RPM

				AIR	SPEED	SPEED IN KTS	2	
		40	09	80	100	120	140	160
1334 382096	05	13	44	104	902	355	559	835
URAG	100	26	89	210	413	706	1118	1670
N1	150	39	134	316	419	1058	1677	2505
SWUAME PEET	200	25	179	422	818	1410	2237	3340

**TABLE 5-37** 

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 600 FT TEMPERATURE: "25 C

AIRCRAFT - CH-47B 230 RPM

				AIR	SPEED	AIR SPEED IN KTS	S	
	200	40	09	80	100	120	1 40	160
7337 3844	05	51	15	122	232	404	649	796
טאאפ.	100	30	102	242	468	812	1289	1924
T-22 Seelles	150	618	153	360	703	1218	1933	2886
SWOANE PEET	200	09	202	184	938	1624	2578	3848

TABLE 5-38

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 6000 FT TEMPERATURE: -5 C

CHINOOK

230 RPM

AIRCRAFT - CH-478

				AIR	SPEED	AIR SPEED IN KTS	S	
	The state of the s	40	09	80	001	120	140	091
Tabh Beau	05	14	48	114	219	374	265	890
DRAG	100	27	9.5	226	434	750	1193	1780
- RG	051	16	241	336	652	1125	1790	2671
SQUARE FEET	200	99	189	944	698	1051	2386	1956

TABLE 5-39

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 6000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-478 230 RPM

				AIR	SPEED	SPEED IN KTS	5.	
Andrew Street,		40	09	80	100	120	140	160
SCHOOL REEL	20	13	45	901	206	347	525	828
2 .	001	52	89	112	405	169	1110	1657
NI SOLITO	051	38	133	315	809	1046	1665	2485
SWUARE FEET	200	15	177	916	808	1395	2220	3314

TABLE 5-40

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 6000 FT TEMPERATURE: 35 C AIRCRAFT - CH-478 230 RPM CHINOOK

,				AIR	AIR SPEED IN KTS	IN KT	5	
		40	09	80	100	120	140	160
· · · · · · · · · · · · · · · · · · ·	90	12	45	66	193	324	615	775
DRAG	100	24	83	197	380	159	1038	1549
	150	36	125	295	895	816	1551	2324
SWUARE PEEL	200	48	.991	391	758	1305	2076	3098

TABLE 5-41

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 8000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 230 RPH

CHINDOK

				AIR	AIR SPEED IN KTS	INKT	S	
		40	09	80	100	120	140	160
Taay asaysa	05	<b>h</b> I	9 h	110	216	376	265	892
2 × × ×	100	28	9.2	220	434	752	1195	1783
2	150	42	139	332	652	1128	1792	2675
SHUAKE FEET	200	95	186	555	870	1504	2389	3566

TABLE 5-42

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 800n FT TEMPERATURE: -5 C AIRCRAFT - CH-478 230 RPM

				AIR	SPEED	IN KTS	S	
		0.	09	80	100	120	140	160
TARR BRANCH	90	13	43	103	198	349	553	825
DRAG	100	92	85	205	401	169	1105	1650
	150	39	128	307	602	5401	1658	2475
SQUARE FEET	200	25	171	116	803	1393	1122	3300

TABLE 5-43

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 8000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-478 230 RPM

				AIR	AIR SPEED IN KTS	IN KT	s	
		40	09	80	001	120	140	160
	05	12	0 10	26	185	324	514	768
OK NO.	100	24	64	161	373	849	1029	1535
21	150	36	611	286	940	972	1543	2303
SAUARE FEE!	200	48	651	382	747	1296	2057	3071

TABLE 5-44

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 800n FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 230 RPM

				AIR	SPEED	AIR SPEED IN KTS	S	
	i sgo	0+	99	80	100	120	140	160
F 3 3 4 7 8 A H 9 2	90	11	37	16	173	+0E	184	718
2 4 .	100	22	74	179	348	209	962	1436
N. 1	051	<b>b</b> €	111	197	524	606	1443	2154
SHUARE PEET	200	51	641	158	669	1212	1924	2871

TABLE 5-45

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG TEMPERATURE: -25 C PRESSURE: 10000 FT

230 RPM AIRCRAFT - CH-47B CHINOOK

				AIR	SPEED	AIR SPEED IN KTS	5	
		0+	09	80	100	120	140	160
0404	80	13	5 8	103	202	348	553	825
מאס	100	97	88	207	404	969	1106	1891
2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	150	39	131	310	509	1045	1659	2476
SAUANE PEET	200	52	175	413	807	1393	2212	3301

TABLE 5-46

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 10000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-478 230 RPM

CHINDOK

				AIR	SPEED	SPEED IN KTS	S	
		40	09	80	100	120	140	160
TO TRANCE	20	12	7	46	187	322	512	764
2 2 2	100	24	8	190	374	5 7 9	1023	1527
NI SOUTH	150	36	122	286	095	996	1535	1622
SWUARE FEET	200	8 17	162	381	147	1289	2047	3055

TABLE 5-47

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG PRESSURE: 10000 FT TEMPERATURE: 15 C AIRCRAFT - CH-478 230 RPM

CHINDOK

				AIR	AIR SPEED IN KTS	IN KT	S	
		40	09	80	100	120	140	160
2 4 9	5.0	11 8 #	38	88	174	300	416	711
OK NO.	100	22	76	177	347	909	952	1421
NI SOUTH	150	33	113	266	521	899	1428	2132
SWUANE FEEL	200	44	151	355	695	6611 569	1904	2843

TABLE 5-48

CORRECTION FUEL FLOW LBS/HR FOR EXTERNAL DRAG

PRESSURE: 10000 FT TEMPERATURE: 35

AIRCRAFT - CH-478 230 RPM

				AIR	AIR SPEED IN KTS	IN KT	S	
		40	09	80	100	120	140	160
	05	01	35	82	163	280	544	599
DRAG	100	21	11	991	325	195	068	1329
N	150	31	106	546	488	1 1 8	1336	1994
SHUARE FEET	200	42	141	332	650	1122	1781	2658

GROUND IDLE FUEL FLOW DATA

TABLE

THES PAGE LEFT HEARK THIERT CONALLY

GROUND IDLE FUEL FLOW AIRCRAFT - CH-47B CHINOOK

			PRES	PRESSURE ALTITUDE (FT)	TUDE (FT)		
		SEA LEVEL	2000	4000	9009	8000	1 0000
Jane Page	-25 C	1220	1164	1072	1000	932	860
DECREES	⊃ <b>5</b> •	1200	1144	1052	980	912	840
CENTICOANE	1S C	1180	1124	1032	096	892	820
- CHILORNOL	<b>၁ S</b> E	1160	1104	1012	040	872	800

ENTRIES ARE AIRCRAFT FUEL FLOW RATES IN LBS/HR

PRECEDING PAGE NOT FILMER BLANK GROSS WEIGHT LIMITS DATA

TABLES
(230 RPM)

GROSS WEIGHT LIMITS

(OUE TO ENGINE)

FOR TAKEOFF CRITERIA #1

1008 OF MAXIMUM POWER (HOGE)

230 RPM AIRCRAFT - CH-478

CHINOOK

		PRESS	PRESSURE ALTITUDE (FT)	UDE (FT)		100000	
		SEA LEVEL	2000	4000	0009	8000	1 0000
30114 BEBERATION	-25 C	51426	48680	45886	43055	40000	37109
OF COFFE	J 5-	48259	45389	42347	39244	36389	33551
CENTIGOANE	15 C	44056	41097	38124	35361	32652	30149
	38 C	38611	36674	33530	31033	28690	26498

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

TABLE 5-51

GROSS WEIGHT LIMITS
(DUE TO TRANSMISSION)
FOR TAKEOFF CRITERIA #1
1008 OF MAXIMUM POWER (HOGE)
AIRCRAFT - CH-47B 230 RPM

	10 E	PRESS	PRESSURE ALTITUDE (FT)	UDE (FT)			in in
	0 254	SEA LEVEL	2000	4000	0009	9000	10000
TEMPERATIOE	-25 C	41649	40829	39948	39042	38107	37109
DEGREES	J 5-	40775	39904	39009	38087	37106	36079
CENTIGRADE	15 C	39915	39033	38124	37160	36149	35149
	35 C	39102	38208	37263	36267	35277	34295

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

STRUCTURAL GROSS WEIGHT LIMIT: 40,000 LBS

GROSS WEIGHT LIMITS

(DUE TO ENGINE)

FOR TAKEOFF CRITERIA #2

OGE 95% OF RATED POWER. VERTICAL RATE OF CLIMB 450 FT/MIN.

AIRCRAFT . CH-478 230 RPM

CHINOOK

		PRESS	PRESSURE ALTITUDE (FT)	UDE (FT)	76576		G 17 65 17 67 18
	tur tur vit	SEA LEVEL	2000	0004	0009	8000	1 0000
	-25 C	47643	45147	42601	40004	37176	34495
IEMFERATURE	⊃ 5 <b>-</b>	94244	42116	39306	36422	33774	31132
DEGREES	15 C	40777	38072	35315	32755	30240	27918
CEN I GRADE	35 C	35662	33326	30978	28668	26500	24473

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

(DUE TO TRANSMISSION) GROSS WEIGHT LIMITS

FOR TAKEOFF CRITERIA #2

TRANSMISSION POWER LIMIT. VERTICAL RATE OF CLIMB 450 FT/MIN. DGE

AIRCRAFT - CH-478 230 RPM

CHINDOK

	13	PRESS	PRESSURE ALTITUDE (FT)	UDE (FT)			
	-58 C	SEA LEVEL	2000	4000	0009	8000	1 0000
	-25 C	39660	38989	38235	37427	36597	35730
DECRETE	) S-	38944	38197	37399	36579	35724	34808
CENTICOADE	15 C	38207	37420	36612	35771	34871	33936
	35 C	37483	36686	35861	34979	34057	33149

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

GROSS WEIGHT LIMITS

(DUE TO ENGINE)

FOR TAKEOFF CRITERIA #3

1008 OF MAXIMUM POWER (HIGE)

AIRCRAFT - CH-478 230 RPH

CHINOOK

		PRESS	PRESSURE ALTITUDE (FT)	UDE (FT)			4016
		SEA LEVEL	2000	0001	0009	8000	1 0000
TEMBER ATIES	-25 C	57622	54547	51420	48251	44828	41589
DEGREES	2 5-	54076	19805	47453	43975	40776	37596
CENTIGOADE	15 C	49333	46051	42719	39623	36588	33783
	3 5 6	43277	40432	37581	34783	32157	29701

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

GROSS WEIGHT LIMITS

(DUE TO TRANSMISSION)

FOR TAKEOFF CRITERIA #3

1008 OF MAXIMUM POWER (HIGE)

AIRCRAFT - CH-478 230 RPH

CHINOOK

<b>国籍以下未發国際經濟等</b>		PRESS	PRESSURE ALTITUDE (FT)	UDE (FT)			
	# \$ 2 C	SEA LEVEL	2000	4000	0009	8000	1 0000
TEMPERATURE	-25 C	80 <b>/</b> 9h	10854	44792	43754	42698	41589
DEGREES	-5 C	45739	16266	43718	42677	41583	+++0+
CENTISOANE	15 C	45244	5+16+	42719	41643	40520	39405
TOWN TOWN	35 C	43824	42814	41758	15904	39548	38447

ENTRIES ARE AIRCRAFT GROSS WEIGHTS IN LBS

VELOCITY LIMITS DATA

TABLES

Y JAMOITM STATE (230 RPM)

**TABLE 5-56** 

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: SEA LEVEL TEMPERATURE: -25 C AIRCRAFT - CH-478 230 RPM

CHINOOK

GROSS WEIGHTS 120 2560 148 3671 154 4048 135 3109 39,000 121 2620 147 3671 154 4048 135 3109 39,000 122 2673 146 3671 153 4048 135 3109 40,000 122 2733 146 3671 152 4048 132 3109		<b>J</b> €	LONG	CONTINUOUS POWER	AX NUOUS FER	POWER (ENGINE)	NER NER	TRANS	TRANSMISSION LIMITS	VELOC	VELOCITY NEVER EXCEED
120     2560     148     3671     154     4048       121     2620     147     3671     154     4048       122     2673     146     3671     153     4048       122     2733     146     3671     152     4048		VEL (KTS)	(LBS/HR)	VEL (KTS)	(LBS/HR)	VEL (KTS)	F.F.		F.F.	VEL (KTS)	VEL F.F.
120         2560         148         3671         154         4048         136           121         2620         147         3671         154         4048         135           122         2673         146         3671         153         4048         134           122         2733         146         3671         152         4048         132	GROSS WE1GHTS (LBS)	37 - 37 - 18 - 18 -	CP2XK81	3	(F8284)	7	KI BOX KIRD		(FBPNEB)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	VESSAL!
121         2620         147         3671         154         4048         135           122         2673         146         3671         153         4048         134           122         2733         146         3671         152         4048         132	37,000	120	2560	148	3671	154	4048	136		151	3846
122         2673         146         3671         153         4048         134           122         2733         146         3671         152         4048         132	98,000	121	2620	147	3671	154	4048	135	3109	148	3724
122 2733 146 3671 152 4048 132	19,000	122	2673	146	3671	153	4048	134	3109	138	3276
	40,000	122	2733	146	3671	152	4048	132		125	2815

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TABLE 5-57

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: SEA LEVEL TEMPERATURE: -5 C

AIRCRAFT - CH-478 230 RPM

CHINOOK

1000	- P	LONG	CONTINUOUS POWER	AX NUOUS VER	POWER	A X X I X X I X X I X X I X X I X X I X X X I X	TRANS	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER
	(KTS)	(LBS/HR)		VEL F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.
GROSS WEIGHTS (LBS)	100	(FBR VARIE)	(K 18)	B. S.	2013 2013 2013	F 8-2 V+88 1	18481	F 2 2 5 4 18 1	25.75	F 8 2 1 H W 1
37,000	125	2581	153	3531	159	3898	143	3137	151	3463
38,000	125	2630	151	3531	159	3898	142	3137	148	3398
39,000	126	2682	150	3531	158	3898	141	3137	138	3030
40,000	127	2739	149	3531	157	3898	140	3137	125	2691

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TABLE 5-58

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: SEA LEVEL TEMPERATURE: 15 C
AIRCRAFT - CH-478 230 RPM

CHINDOK

	J&	RANGE	CONTINUOUS	NUOUS	LOU	N S S S S S S S S S S S S S S S S S S S	TRANS	TRANSMISSION LIMITS	VELOC	VELOCITY NEVER
	VEL (KTS)	(LBS/HR)	VEL (KTS)	VEL F.F.		VEL F.F.	VEL	VEL F.F.	VEL	VEL FOF
GROSS WEIGHTS (LBS)	1613	2 HVSE JO	201 201 201 201 201 201 201 201 201 201	2 EPS 2 CAR			- K			
37.000	130	2642	148	3192	160	3629	148	3163	151	3289
30,000	131	1692	147	3192	159	3629	146	3	67	
39,000	131	2742	146	3192	158	3629	145		138	
40,000	132	2798	145	3192	157		77	3163	125	2631

TABLE 5-59

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: SEA LEVEL TEMPERATURE: 35 C
AIRCRAFT - CH-47B 230 RPM

18.000	J& .	LONG	CONTINUOUS POWER	AX NUOUS WER	POWER	AX VER VER	TRANS	TRANSMISSION LIMITS	VELOC	VELOCITY NEVER
1000	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	VEL F.F.		VEL F.F.	VEL (KTS)	VEL F.F. (KTS)	VEL	VEL F.F.
GROSS WEIGHTS (LBS)	20 A	T BRANK F		1.865,841	3.76	18 A V P E	(2) (2) (3) (4) (4)	FR2VEN.		TREVERS
37,000	135	27,10	139	2814	153	3243	151	3191	147	3049
38,000	135	2764	137	2814	152	3243	150	3191	143	2983
39,000	136	2814	136	2814	150	3243	149	3191	134	2765
40,000	136	1982	134	2814	149	3243	147	3191	121	2533

**TABLE 5-60** 

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 2000 FT TEMPERATURE: -25 C

AIRCRAFT - CH-478 230 RPM

	75	LONG	CONTINUOUS POWER	VER	PONER ENGINE)	NE N	TRANS	TRANSMISSION LIMITS	VELOCI	VELOCITY NEVER
0.00.47	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.
GROSS WEIGHTS (LBS)	17     X     Y	20 20 20 20 30 30 30 30 30 30 30 30 30 30 30 30 30	1 2 2 2	1 30 1 40 1 40 1 40 1 40 1 40 1 40 1 40 1 4			19 A		501 445 667	10 mm
37,000	122	2529	148	3534	154	3853	137	3060	151	3694
38,000	. 123	2590	147	3534	153	3853	136	3060	148	3585
39,000	123	2631	148	3534	151	3853	129	3060	138	3172
40,000	123	2672	145	3534	151	3853	134	3060	125	27.35

**TABLE 5-61** 

(INCLUDING FUEL FLOW RATES)

(INCLUDING FUEL FLOW RATES)
PRESSURE: 2000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-47B 230 RPM

4.600	Эĕ	LONG	MAX CONTINUOUS POWER	NX HUOUS VER	MAX POWER (ENGINE)	N X NER	TRANS	TRANSMISSION LIMITS	VELOC!	VELOCITY NEVER EXCEED
987	(KTS)	(LBS/HR)	VEL (KTS)	(KTS) (LBS/HR)		(KTS) (LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.
GROSS EIGHTS (LBS)	61 61 14 24	1864302	K 1.2 y	10					1 2 4	TB 23 81 K.1
37,000	126	2535	150	3293	158	3681	145	3086	151	3350
38,000	127	2596	149	3293	158	3681	**1	3086	148	3264
39,000	128	1992	148	3293	157	3681	142	3086	138	2925
40,000	130	2740	147	147 3293	155	3681	141	3084	125	2617

TABLE 5-62

VELOCITY LIMITS TABLE (INCLUDING FUEL FLOW RATES) PRESSURE: 2000 FT TEMPERATURE: 15 C

AIRCRAFT - CH-47B

230 RPM

38,000	7.5	LONG	CONTINUOUS POWER	IX IUOUS IER	POWER (ENGINE)	A X W X W X W X W X W X W X W X W X W X	TRANS	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER
17,1000	VEL (KTS)	F.F.	VEL (KTS)	VEL F.F.		VEL F.F.		VEL F.F.	VEL (KTS)	VEL F.F.
GROSS E1GHTS (LBS)		1 000		TERNING THE		- F C C C K W A	Comments of the same	18/08/813	. 15	
37,000	132	1652	145	2954	158	3396	150	3111	146	3005
38,000	132	2648	143	12954	157	3396	148	3111	143	2939
39,000	133	2710	142	2954	155	3396	147	3111	134	2724
40,000	134	2777	140	2954	154	3396	146	3111	121	2489

TABLE 5-63

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 2000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 230 RPM

000	<b>⊐</b> €	LONG	CONTINUOUS POWER	AX NUOUS VER	POWER (ENGINE)	AX NE >	TRANS	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER EXCEED
1000	VEL (KTS)	F.F.		VEL F.F.	VEL (KTS)	(KTS) (LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.
GROSS WEIGHTS (LBS)	60					Pagasalan				
37,000	136	2653	134	2603	051	3037	153	3134	142	2811
38,000	136	2706	132	2603	148	3037	151	3134	139	2775
39,000	137	2760	130	2603	441	3037	150	3134	130	2600
40,000	137	2823	128	2603	145	3037	1 48	3134	108	2312

TABLE 5-64

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: 4000 FT TEMPERATURE: -25 C
AIRCRAFT - CH-478 230 RPM

	25	LONG	CONTINUOUS	Snous	A V V V V V V V V V V V V V V V V V V V	ZEXX ZEX	TRANS	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER EXCEED
37,000	VEL	VEL F.F.	VEL (KTS)	VEL F.F.		VEL F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.
GROSS WEIGHTS (LBS)		100								
37,000	123	2475	147	3380	153	3651	139	3013	151	3563
38,000	123	2517	146	3380	152	3651	137	3013	148	3470
39,000	123	2559	145	3380	151	3651	136	3013	138	3091
40,000	123	2640	144	3380	149	3651	135	3013	125	1692

**TABLE 5-65** 

VELOCITY LIMITS TABLE (INCLUDING FUEL FLOW RATES)

PRESSURE: 4000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-478 230 RPM

CH I NOOK

			-		-		-			
	A	LONG	CONTINUOUS POWER	A X VUOUS VER	POWER (ENGINE)	K X VER NE)	TRANS	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER EXCEED
24 - 840 S	VEL (KTS)	(KTS) (LBS/HR)	VEL (KTS)	(LBS/HR)	(KTS)	(LBS/HR)	VEL (KTS)	VEL F.F. VEL F.F. VEL F.F. (KTS) (LBS/HR)		VEL F.F. (KTS) (LBS/HR)
GROSS WEIGHTS (LBS)										
37,000	130	2533	147	3076	951	3445	941	3036	9 1 1	3046
38,000	130	2594	145	3076	155	3445	144	3036	143	2985
39,000	131	2649	144	3076	154	3445	143	3036	133	2726
40,000	131	2704	142	3076	152	3445	141	3036	121	2473

**TABLE 5-66** 

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: 4000 FT TEMPERATURE: 15 C
AIRCRAFT - CH-478 230 RPM
CHINOOK

34,7530	7. R	LONG	CONTINUOUS POWER	I X I U O U S E R	POWER (ENGINE)	X VER	TRANSP	TRANSHISSION LIHITS	VELOC	VELOCITY NEVER Exceed
	VEL (KTS)	F.F.	VEL (KTS)	VEL F.F. KTS) (LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	(KTS) (LBS/HR)	VEL (KTS)	VEL F.F.
GROSS IE 16HTS (LBS)										
37,000	134	5992	141	2745	154	3156	151	3060	145	2769
38,000	135	2640	139	2745	152	3156	150	3060	139	2733
39,000	136	2710	137	2745	151	3156	148	3060	129	2556
40,000	136	2761	135	2745	149	3156	146	3060	901	2257

**TABLE 5-67** 

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 4000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-47B 230 RPM CHINOOK

34080		LONGE	CONTINUOUS POWER	AX NUOUS WER	E O S	POWER (ENGINE)	TRANS	TRANSMISSION LIMITS	VELOC.	VELOCITY NEVER EXCEED
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	VEL F.F.		VEL F.F. (KTS) (LBS/HR)	VEL (KTS)	F.F.	VEL (KTS)	VEL F.F. (KTS) (LBS/HR)
GROSS NE 1 GHTS (LBS)										
37,000	137	2197	128	2415	145	2830	154	3083	137	2621
38,000	138	2681	125	2415	143	2830	151	3083	134	2602
39,000	138	12757	122	2415	141	2830	641	3083	113	2295
40,000	138	2836	117	2415	138	2830	147	3083	63	2239

TABLE 5-68

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 6000 FT TEMPERATURE: -25 C AIRCRAFT - CH-478 230 RPM

0000	76	LONG	CONTINUOUS	N X Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y	POWER (ENGINE)	NE D	TRANS	TRANSMISSION LIMITS	VEL OC	VELOCITY NEVER EXCEED
	VEL (KTS)	VEL F.F. KTS) (LBS/HR)	VEL (KTS)	VEL F.F.		VEL F.F. (KTS) (LBS/HR)	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	VEL F.F.
GROSS WEIGHTS (LBS)										
37,000	122	2409	145	3181	151	3443	139	2968	9 1 1	3254
38,000	123	1642	143	3181	149	3443	138	2968	143	3166
39,000	123	2536	142	3181	148	3443	137	2968	134	2867
40,000	122	2583	140	3181	941	3443	135	2968	121	2548

TABLE 5-69

VELOCITY LIMITS TABLE (INCLUDING FUEL FLOW RATES)

PRESSURE: 6000 FT TEMPERATURE: -5 C

AIRCRAFT - CH-478 230 RPM

	78	LONG	CONTINUOUS	MAX	T D Z	NAX NEER N	TRANS	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER EXCEED
000,48	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.	-	F.F.	VEL (KTS)	VEL F.F. VEL F.F. (KTS) (1.85/HR)	VEL (KTS)	VEL F.F.
GROSS WEIGHTS (LBS)										2250
37,000	131	2502	143	2882	152	3198	147	2991	141	2816
38,000	131	2556	142	2882	151	3198	145	2991	138	1775
39,000	131	2612	140	2882	149	3198	143	2991	129	2543
40.000	132	2672	138	2882	1.47	3198	141	2991	901	2230

**TABLE 5-70** 

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: 6000 FT TEMPERATURE: 15 C
AIRCRAFT - CH-478 230 RPM

	٥٦.	LONG	H	X	I	×	TRANS	TRANSMISSION	VELOC	VELOCITY NEVER
	140	3500	POWER	VER	(ENGINE)	NE)	3	MITS	<b>J</b>	ACEED
181000	VEL (KTS)	(KTS) (LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.		VEL F.F.	VEL (KTS)	VEL F.F.
GROSS WEIGHTS (LBS)	On Cre	S & S &	PCI						10	5133
37,000	136	9552	136	2559	149	2934	151	3012	137	2588
38,000	135	2613	134	2559	147	2934	6 + 1	3012	132	2532
39,000	135	2892	131	2559	145	2934	147	3012	110	2240
40,000	136	9912	127	2559	142	2934	441	3012	16	2191

TABLE 5-71

VELOCITY LIMITS TABLE

(INCLUDING FUEL FLOW RATES)

PRESSURE: 6000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 230 RPM

R) (KTS) (LBS/HR) 119 2260 119 2260 103 2260	LONG	CONT	CONTINUOUS POWER	PAX POWER (ENGINE)	NE D	TRANS	TRANSMISSION LIMITS	VELOC	VELOCITY NEVER Exceed
138 2622 119 2260 138 2700 113 2260 138 2791 103 2260		-	(LBS/HR)		VEL F.F.	VEL (KTS)	VEL F.F. (KTS)	VEL (KTS)	VEL F.F.
138 2622 119 2260 138 2700 113 2260 138 2791 103 2260								10 H	8 5 5 8
138 2700 113 2260 138 2791 103 2260				139	2626	152	3033	*11	114 2197
138 2791 103 2260		-	-	135	2626	641	3033	106	2201
2760 00 2210		-	L	131	2626	146	3033	16	2187
0077	8 2899	-	2260	126	2626	143	3033	0	0 933

**TABLE 5-72** 

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: 8000 FT TEMPERATURE: -25 C
AIRCRAFT - CH-478 230 RPM

14,000	- C (1)	ONG	CONTINUOUS	1X 1000 FROUS	POWER (ENGINE)	YER NE)	TRANS	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER EXCEED
29,900	VEL (KTS)	(LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	KTS) (LBS/HR)	VEL (KTS)	VEL F.F.
GROSS WEIGHTS (LBS)		7			T will	0.00	**	2840	123	60 30 30
37,000	122	1962	141	2965	147	3207	140	2927	142	1667
38,000	122	2442	139	2965	145	3207	138	2927	139	1462
39,000	122	2499	138	2965	143	3207	136	2927	129	2686
40,000	122	2561	136	2965	142	3207	135	2927	901	2232

TABLE 5-73

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: 8000 FT TEMPERATURE: -5 C
AIRCRAFT - CH-478 230 RPM

1	<
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0.500	57 67 87 57 87 54	LONG	CONTI	CONTINUOUS	POWER	A X ZER NE)	TRANS	TRANSHISSION LIMITS	VELOC E	VELOCITY NEVER EXCEED
0.000	(KTS)	(LBS/HR)	VEL (KTS)	(LBS/HR)	VEL (KTS)	VEL F.F.	(KTS)	F.F.	VEL (KTS)	VEL F.F.
GROSS IE IGHTS (LBS)	0	97.5				7 C. N.	0 +		15 to 10 to	1991
0001	132	2412	139	2690	147	2973	147	2948	137	2623
38,000	127	2459	136	2690	145	2973	541	2948	131	2542
39,000	128	2632	134	2690	143	2973	145	2948	109	2212
40,000	127	1192	131	2690	140	2973	139	2948	06	2158

**TABLE 5-74** 

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: 8000 FT TEMPERATURE: 15 C
AIRCRAFT - CH-478 230 RPM

101066	78	LONG	CONTINUOUS	Snon	POWER	X N	TRANSI	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER
8 * CCC	127	A 2 5 2 4 3 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2	EK	LENG	NE .				The second second second
000.8	(KTS)	(LBS/HR)	VEL (KTS)	(KTS) (LBS/HR)	VEL (KTS)	(KTS) (LBS/HR)	VEL (KTS)	(LBS/HR)	VEL (KTS)	VEL F.F.
GROSS E 1GHTS (LBS)	73 67	9763	8.8	\$105	8 5 1	S d 3 d	· · · · · · · · · · · · · · · · · · ·	2987	e e	8448
000121	136	2557	128	2386	142	2715	150	2968	110	2135
38,000	136	2992	123	2386	139	2715	261	2968	103	2149
39,000	136	2756	118	2386	135	2715	661	2968	88	2141
40,000	136	5864	112	2386	130	2715	140	2968	0	0 033

TABLE 5-75

VELOCITY LIMITS TABLE (INCLUDING FUEL FLOW RATES)

PRESSURE: 8000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-478 230 RPM

000, 84	N. N.	LONG	CONTINUOUS	X UOUS ER	POWER (ENGINE)	NEX NEX ()	TRANSF	TRANSMISSION LIMITS	VELOCI E)	VELOCITY NEVER EXCEED
000	VEL (KTS)	(LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	F.F.	VEL (KTS)	(L85/HR)
GROSS ME1GHTS (LBS)	36	60 00 00 00 00 00 00 00 00 00 00 00 00 0	120 873 W.	5 0.5 8	2 H	200	094	2002	110	acts
37,000	138	2679	47	2012	126	2434	149	2987	8.4	2068
38,000	138	2793	0	2102	120	2434	145	2987	0	0
39,000	137	2904	0	2012	116	2434	140	2987	0	0
40.000	136	3018	0	2102	66	2434	136	2987	0	0 43333

**TABLE 5-76** 

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: 10000 FT TEMPERATURE: -25 C
AIRCRAFT - CH-478 230 RPM
CHINOOK

1 11 11	3 E	LONG	CONTINUOUS	NX 1000s	FPAAX	X Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	TRANS	TRANSMISSION LIMITS	VELOC	VELOCITY NEVER EXCEED
8 1030	VEL (KTS)	(LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F. (KTS) (LBS/HR)	VEL (KTS)	VEL F.F. (KTS) (LBS/HR)
GROSS E1GHTS (LBS)	#1 679 679 84	50 20 20 20 20 20 20 20 20 20 20 20 20 20	271 201	5461	1,40	5945	W W	7083	1.05	8 0 2 8
37,000	122	2369	136	2757	142	2984	140	2888	137	2792
38,000	124	2488	134	2757	140	2984	137	2888	131	2681
39,000	124	1752	131	2757	138	2984	135	2888	109	2258
40,000	124	2663	128	2757	135	2984	132	2888	06	2148

TABLE 5-77

VELOCITY LIMITS TABLE
(INCLUDING FUEL FLOW RATES)
PRESSURE: 10000 FT TEMPERATURE: -5 C
AIRCRAFT - CH-478 230 RPM

4 1000	30 H	LONG	CONTINUOUS POWER	X IUQUS ER	POWER (ENGINE)	NE NE )	TRANS	TRANSMISSION LIMITS	VELOC	VELOCITY NEVER EXCEED
	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS)	VEL F.F.	VEL (KTS)	VEL F.F. KTS) (LBS/HR)	(KTS)	F.F.	VEL (KTS)	VEL F.F.
R055 16HTS L85)	ers ers ers	E C C S	0 (7)	A BY OF	100	\$0 90 90	1,70	(21 810 830 320 320	75 10	\$7.05
37.000	127	2415	131	2491	140	2746	145	2907	108	2102
38,000	127	2498	127	2491	137	2746	142	2907	101	2116
39,000	126	2584	123	2491	133	2746	138	2907	86	2106
. 000 0	131	2809	117	1642	128	2746	134	2907	0	0

TABLE 5-78

VELOCITY LIMITS TABLE (INCLUDING FUEL FLOW RATES)

PRESSURE: 10000 FT TEMPERATURE: 15 C AIRCRAFT - CH-478 230 RPM

CHINOOK

- C - C - C - C - C - C - C - C - C - C	30	LONG	2	4 X	E	XX	TRANS	TRANSHISSION	VELOC	VELOCITY NEVER
1 × 1 0 0 0 0	2	ANGE	CONTI	POWER	(ENGINE)	I NE )	3	41 TS		ALEEU
24,800	(KTS)	F.F.	VEL (KTS)	(LBS/HR)	VEL (KTS)	(LBS/HR)	VEL (KTS)	F.F.	VEL (KTS)	(LBS/HR)
GROSS WEIGHTS (LBS)		D × 5 %			Q-1	G 3 (3)		15 -25 -40 -15	Ε.	a
37,000	136	2648	112	2209	130	2514	146	2925	0	0
38,000	135	1472	102	2209	124	2514	1 % 1	2925	0	0 1833
39,000	134	2860	101	2209	119	2514	137	2925	0	0
40,000	133	2972	0	2209	911	2514	133	2925	0	0

190

TABLE 5-79

VELOCITY LIMITS TABLE (INCLUDING FUEL FLOW RATES)

PRESSURE: 10000 FT TEMPERATURE: 35 C

AIRCRAFT - CH-47B 230 RPM

0.000	Jæ	ONG	CONTI	CONTINUOUS	POWER (ENGINE)	A.K.	TRANS	TRANSHISSION LIMITS	VELOC	VELOCITY NEVER
000 8	VEL (KTS)	F.F. (LBS/HR)	VEL (KTS) (	F.F.	VEL (KTS)	VEL F.F.	VEL (KTS)	F.F.	VEL (KTS)	(LBS/HR)
GROSS WEIGHTS (LBS)			8			6				0
37,000	136	2790	0	1952	96	2255	142	2943	0	0
38,000	135	2909	0	1952	001	2255	137	2943	0	0
39,000	133	2997	0	1952	0	2255	132	2943	0	0
40.000	131	3084	0	1952	0	2255	127	2943	0	0

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anere are four functions that can be used to catchiate the basic fuel flow for the CH-4/B helicopter operating at 225 RPM. In order to use the junctions the following data is meeded:

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I. Gross weight

which of the roun toactions will be used depends on the flight mode It after fourther is for MIGE (Hover in Great Effect).

(#3 T.M . 4837) P = (3848) 32

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#### FUNCTIONS FOR CALCULATING BASIC FUEL FLOW

The third function is for MDE (Nap of the Earth). FF\_1MOET = F (TEMP, MLT, GW)

The sourch lunction is for Formary Fiftht.

IT (Forward time) . \* (AS) TEMP, ALT, Gat)

The equation for FF (MIGE) 18)

15 (19831) (T.M.) U.+ (NO) 3 % (MAT) Q + (TD) A \* (SULE) NA (WD) (9M31) 5 + (WD) (11M) 4 X + (319) (31/31) ATM) 0 + .

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\* AEESOOTO . C- - 0

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### CH-47B Operating at 225 RPM

There are four functions that can be used to calculate the basic fuel flow for the CH-47B helicopter operating at 225 RPM. In order to use the functions the following data is needed:

- 1. Flight Mode
- 2. Temperature
- 3. Pressure (altitude)
- 4. Gross weight

Which of the four functions will be used depends on the flight mode. The first function is for HIGE (Hover In Ground Effect).

The second function is for HOGE (Hover Out of Ground Effect).

The third function is for NOE (Nap of the Earth).

The fourth function is for Forward Flight.

The equation for FF (HIGE) is:

$$FF (HIGE) = A (ALT) + B (TEMP) + C (GW) + D (ALT)(TEMP)$$

$$+ E (ALT) (GW) + F (TEMP) (GW)$$

$$+ G (ALT) (TEMP) (GW) + K$$

Where ALT is the altitude, TEMP is the temperature and GW is the gross weight and the constants have the following values:

 $A = -4.61702715 \times 10^{-2}$   $E = 1.37115987 \times 10^{-6}$ 

 $B = 6.40335783 \times 10^{-1}$   $F = 5.94156736 \times 10^{-5}$ 

 $C = 5.56014264 \times 10^{-2}$   $G = 1.59960301 \times 10^{-8}$ 

D = -3.81002334  $K = 4.72597931 \times 10^2$ 

The equation for FF (HOGE) is exactly the same form as FF (HIGE). A new set of values for the constants is used. These values are:

 $A = -5.87926949 \times 10^{-2}$ 

 $E = 2.05332455 \times 10^{-6}$ 

 $B = -7.93196566 \times 10^{-1}$ 

 $F = 1.26924446 \times 10^{-4}$ 

 $C = 6.58447044 \times 10^{-2}$ 

 $G = 1.66085032 \times 10^{-8}$ 

 $D = -3.59832127 \times 10^{-4}$ 

 $K = 3.73129303 \times 10^2$ 

The equation for FF (NOE) is once again the same as FF (HIGE). The new values for the constants are:

 $A = -5.48598277 \times 10^{-2}$ 

 $E = 1.79103192 \times 10^{-6}$ 

 $B = 1.96384981 \times 10^{-1}$ 

 $F = 8.06580138 \times 10^{-5}$ 

 $C = 5.71278753 \times 10^{-2}$ 

 $G = 2.00339594 \times 10^{-8}$ 

 $D = -4.65883044 \times 10^{-4}$ 

 $K = 4.45467682 \times 10^2$ 

For the Forward Flight modes the form of the equation is:

 $FF = A(AS) + B(AS^2) + C(AS^3) + D(TEMP) + E(GW) + F(ALT) + G(AS^3)(TEMP)$ 

+  $H(AS^2)(TEMP) + I(AS)(TEMP) + J(AS^3)(GW) + K(AS^2)(GW)$ 

 $+ L(AS)(GW) + M(AS^{3})(ALT) + N(AS^{2})(ALT) + O(AS)(ALT) + P(TEMP)(GW)$ 

+ Q(TEMP)(ALT) + R(GW)(ALT) + S(TEMP)(GW)(ALT) + T

Where AS is the air speed in kts and the values of the constants are:

A = -8.80385256

 $K = -6.21839206 \times 10^{-7}$ 

 $B = 9.87290759 \times 10^{-2}$ 

 $L = -4.27730381 \times 10^{-4}$ 

 $c = 1.8343702 \times 10^{-4}$ 

 $M = -4.22321436 \times 10^{-8}$ 

D = 3.3153846

 $N = 6.71878615 \times 10^{-6}$ 

 $E = 6.58309292 \times 10^{-2}$ 

 $0 = -5.24116447 \times 10^{-4}$ 

 $F = -2.83557344 \times 10^{-2}$ 

 $P = 2.1382421 \times 10^{-5}$ 

 $G = -6.67641933 \times 10^{-6}$ 

 $Q = 2.55803116 \times 10^{-5}$ 

 $H = 1.12381099 \times 10^{-3}$ 

 $R = 1.10589838 \times 10^{-6}$ 

 $I = -8.5652709 \times 10^{-2}$ 

 $S = 2.45258373 \times 10^{-10}$ 

 $J = 1.31523453 \times 10^{-8}$ 

 $T = 6.95736298 \times 10^2$ 

These functions allow anyone with a simple calculator to figure the fuel flow of the aircraft and bypass both looking up the values and interpolating for points in between the data points in the tables.

The above equations calculate the basic fuel flow for the CH-47B helicopter operating at 225 RPM with the following accuracies:

FF (HIGE) - 99.64%

FF (HOGE) - 99.54%

FF (NOE) - 99.47% \*\* what a contract (NOE) 37 mot actions and

FF (Forward Flight) - 99.44%

#### 2. CH-47B Operating at 230 RPM

There are four functions that can be used to calculate the basic fuel flow for the CH-47B helicopter operating at 230 RPM. In order to use the functions the following data is needed:

- 1. Flight Mode
- 2. Temperature
- 3. Pressure (altitude)
- 4. Gross weight

Which of the four functions will be used depends on the flight mode. The first function is for HIGE (Hover In Ground Effect).

The second function is for HOGE (Hover Out of Ground Effect).

The third function is for NOE (Nap of the Earth).

The fourth function is for Forward Flight.

The equation for FF (HIGE) is:

Where ALT is the altitude, TEMP is the temperature and GW is the gross weight and the constants have the following values:

 $A = -9.25630601 \times 10^{-2}$   $E = 2.61715525 \times 10^{-6}$  B = -6.68697202  $F = 2.54929997 \times 10^{-4}$ 

 $C = 6.22293353 \times 10^{-2}$   $G = -2.35182049 \times 10^{-9}$ 

 $D = 3.16956106 \times 10^{-4}$   $K = 2.55646027 \times 10^{2}$ 

The equation for FF (HOGE) is exactly the same form as FF (HIGE). new set of values for the constants is used. These values are:

 $A = -1.06445056 \times 10^{-1}$ 

 $E = 3.33738353 \times 10^{-6}$ 

B = -6.5242281

 $F = 2.81714834 \times 10^{-4}$ 

 $C = 7.75390863 \times 10^{-2}$ 

 $G = -2.35957049 \times 10^{-10}$ 

 $D = 2.65679631 \times 10^{-4}$ 

K = -3.05105286 X 10

The equation for FF (NOE) is once again the same as FF (HIGE). The new values for the constants are:

 $A = -1.15865572 \times 10^{-1}$ 

 $E = 3.43923034 \times 10^{-6}$ 

B = -4.67301321

 $F = 2.12110579 \times 10^{-4}$ 

 $C = 6.62516356 \times 10^{-2}$ 

 $G = 2.09664508 \times 10^{-8}$ 

 $D = -5.05613658 \times 10^{-4}$ 

 $K = 1.40741119 \times 10^2$ 

For the Forward Flight modes the form of the equation is:

 $FF = A(AS) + B(AS^2) + C(AS^3) + D(TEMP) + E(GW) + F(ALT) + G(AS^3)(TEMP)$ 

 $+ H(AS^2)(TEMP) + I(AS)(TEMP) + J(AS^3)(GW) + K(AS^2)(GW)$ 

 $+ L(AS)(GW) + M(AS^{3})(ALT) + N(AS^{2})(ALT) + O(AS)(ALT) + P(TEMP)(GW)$ 

+ Q(TEMP)(ALT) + R(GW)(ALT) + S(TEMP)(GW)(ALT) + T

Where AS is the air speed in kts and the values of the constants are:

A = 2.48220417

 $K = 3.43891804 \times 10^{-6}$ 

 $B = -1.66443847 \times 10^{-2}$ 

 $L = -8.007586 \times 10^{-4}$ 

 $C = 5.2223634 \times 10^{-4}$ 

 $M = -8.30491462 \times 10^{-8}$ 

n = 5.27718383

 $N = 1.91262891 \times 10^{-5}$ 

 $F = 8.66340864 \times 10^{-2}$ 

 $0 = -1.64952299 \times 10^{-3}$ 

 $F = 4.93448263 \times 10^{-3}$ 

 $P = 4.44708858 \times 10^{-5}$ 

F = 4.93448203 X 1U

 $0 = 5.94951031 \times 10^{-4}$ 

 $G = -1.07220363 \times 10^{-5}$ 

- 1 00010001 v 10-6

 $H = 1.80055597 \times 10^{-3}$ 

 $R = 1.08313091 \times 10^{-6}$ 

 $I = -1.40366418 \times 10^{-1}$ 

S = -1.57275322 X 10<sup>-8</sup>

 $J = -6.73745504 \times 10^{-11}$ 

T = 1.78298035 X 10

These functions allow anyone with a simple calculator to figure the fuel flow of the aircraft and bypass both looking up the values and interpolating for points in between the data points in the tables.

The above equations calculate the basic fuel flow for the CH-47B helicopter operating at 230 RPM with the following accuracies:

FF (HIGE) - 97.81%

FF (HOGE) - 98.33%

FF (NOE) - 97.26%

FF (Forward Flight) - 99.33%

The function below will calcatabe the delte fuel flow for drag for the CH-476 helicopter operating at 225 RPM. Recall from the discussion is changed three basic fuel flow value because true to the basic fuel flow value because true to the flow.

in order to use the function the following data is needed:

Equivalent Equare Rootage of Orag (50)

Topos are away test of (TM) short tin .t.

#### APPENDIX B

## FUNCTIONS FOR CALCULATING DELTA FUEL FLOW FOR DRAG

 $a(AS^2/(TEMP) + B(AS^2)(TEMP) + I(AS)(TEMP) + J(AS^2)(SO) + K(AS^2)(SO) + K(AS^2)(SO) + R(AS^2)(ALT) + R(AS^2$ 

+ O(TEND)(ALT) + R(SQ)(ALT) + S(SQ)(ALT)(TEMP) + T Where the constants have the following values:

= -1.20196528 K = -3.05086267 X 10<sup>-6</sup>

8-01 x 15165545 1- " N - 1.5255615 x 10-8

 $D = 3.22824808 \times 10^{-6}$  $E = 1.28774293 0 \times 1.32419369 \times 10^{-4}$ 

F = 2.72059236 X 10°2 P = -2.80175551 X 10°2

6 - -2.37203825 X 10-6 G-- -1.32038707 X 10-6

TOT X 15080818 & 2 PLANK

4.49367928 X 10 T = 4.3897625 X 10<sup>2</sup>

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#### 1. CH-47B Operating at 225 RPM

The function below will calculate the delta fuel flow for drag for the CH-47B helicopter operating at 225 RPM. Recall from the discussion in chapter three that this value is added to the basic fuel flow value whenever drag is increasing the rate of fuel flow.\*

In order to use the function the following data is needed:

- 1. Air Speed (AS)
- 2. Equivalent Square Footage of Drag (SQ)
- 3. Temperature (TEMP) in degrees centigrade
- 4. Altitude (ALT) in feet above sea level

#### That is:

$$FF (Drag) = f(AS, SQ, TEMP, ALT)$$

The equation for FF (Drag) is:

+ 
$$G(AS^3)(TEMP)$$
 +  $H(AS^2)(TEMP)$  +  $I(AS)(TEMP)$  +  $J(AS^3)(SQ)$  +  $K(AS^2)(SQ)$ 

$$+ L(AS)(SQ) + M(AS^3)(ALT) + N(AS^2)(ALT) + O(AS)(ALT) + P(TEMP)(SQ)$$

+ 
$$Q(TEMP)(ALT)$$
 +  $R(SQ)(ALT)$  +  $S(SQ)(ALT)(TEMP)$  +  $T$ 

## Where the constants have the following values:

A = -1.25196528	$K = -3.05088247 \times 10^{-5}$
$B = 1.40879075 \times 10^{-2}$	$L = 3.28588486 \times 10^{-3}$
$C = 6.59073385 \times 10^{-5}$	M = -1.57229121 X 10 <sup>-8</sup>
D = 3.22824508	$N = -1.4745705 \times 10^{-6}$
E = 1.26174283	$0 = 1.32419169 \times 10^{-4}$

$$F = 2.72059236 \times 10^{-2}$$
  $P = -2.80175551 \times 10^{-2}$ 

$$G = -2.37200825 \times 10^{-6}$$
  $Q = -1.32025707 \times 10^{-6}$ 

$$H = 1.19079516 \times 10^{-4}$$
  $R = -2.47727552 \times 10^{-4}$ 

$$s = -1.09635592 \times 10^{-2}$$
  $s = 8.9789021 \times 10^{-7}$ 

$$J = 4.49367928 \times 10^{-6}$$
  $T = -1.3597625 \times 10^{2}$ 

<sup>\*</sup>There is no delta fuel flow for drag for HIGE, HOGE or NOE flight.

This equation calculates the delta fuel flow for drag value with an accuracy of 99.67%. It should be noted that in some instances the computed value will be negative. If this occurs, zero (9) should be used as the value for delta fuel flow.

N = 3.16199411 K 10"?

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0 - -3.42952268 x 10-7

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5 - 8.77986086 x 10-7

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0 = -2.01632308 x 10-6

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J = 4.51088698 x 10"6

### 2. CH-47B Operating at 230 RPM

The function below will calculate the delta fuel flow for drag for the CH-47B helicopter operating at 230 RPM. Recall from the discussion in chapter three that this value is added to the basic fuel flow value whenever drag is increasing the rate of fuel flow.\*

In order to use the function the following data is needed:

- 1. Air Speed (AS)
- 2. Equivalent Square Footage of Drag (SQ)
- 3. Temperature (TEMP) in degrees centigrade
- 4. Altitude (ALT) in feet above sea level

#### That is:

The equation for FF (Drag) is:

$$FF (Drag) = A(AS) + B(AS^2) + C(AS^3) + D(TEMP) + E(SO) + F(ALT)$$

$$+ G(AS^3)(TEMP) + H(AS^2)(TEMP) + I(AS)(TEMP) + J(AS^3)(SO) + K(AS^2)(SO)$$

$$+ L(AS)(SQ) + M(AS^3)(ALT) + N(AS^2)(ALT) + O(AS)(ALT) + P(TEMP)(SQ)$$

+ 
$$Q(TEMP)(ALT) + R(SQ)(ALT) + S(SQ)(ALT)(TEMP) + T$$

Where the constants have the following values:

$$A = 9.51979216 \times 10^{-3}$$
  $K = -3.14629142 \times 10^{-5}$ 

$$B = 5.16340137 \times 10^{-4}$$
 L = 2.88915634 × 10<sup>-3</sup>

$$c = 1.09157067 \times 10^{-4}$$
  $M = -2.13324689 \times 10^{-8}$ 

$$D = 2.91942126$$
  $N = 3.15199411 \times 10^{-7}$ 

$$E = 1.28689334$$
  $0 = -3.66419554 \times 10^{-5}$ 

$$p = -2.7944278 \times 10^{-2}$$

$$Q = -2.01532308 \times 10^{-6}$$
  $Q = -3.42952262 \times 10^{-7}$ 

$$H = 1.95831512 \times 10^{-6}$$
  $R = -2.48567256 \times 10^{-4}$ 

$$I = 4.53233719 \times 10^{-4}$$
  $S = 8.77988086 \times 10^{-7}$ 

$$J = 4.51088698 \times 10^{-6}$$
  $T = -1.67979713 \times 10^{2}$ 

<sup>\*</sup>There is no delta fuel flow for drag for MIGE, HOGE or NOE flight.

This equation calculates the delta fuel flow for drag value with an accuracy of 99.68%. It should be noted that in some instances the computed value will be negative. If this occurs, zero ( $\emptyset$ ) should be used as the value for delta fuel flow.

# APPENDIX C FUNCTIONS FOR CALCULATING GROUND IDLE FUEL FLOW

The equation, for FF (Idle) is:

The function below will calculate the ground idle fuel flow rate for the CH-47B helicopter. In order to use the function the following data is needed:

- 1. Temperature (TEMP) in degrees centigrade.
- 2. Altitude (ALT) in feet above sea level.

That is:

FF (Idle) = f (TEMP, ALT)

The equation, for FF (Idle) is:

FF (Idle) = A(TEMP) + B(ALT) + C(TEMP)(ALT) + D(TEMP<sup>2</sup>) + E(ALT<sup>2</sup>) + F Where the constants have the following values:

 $A = -9.99999985 \times 10^{-1}$ 

 $D = 1.60979201 \times 10^{-9}$ 

 $B = -3.73999695 \times 10^{-2}$   $E = 7.14257675 \times 10^{-8}$ 

 $C = -1.07357118 \times 10^{-11}$  F = 1.20071422 × 10<sup>3</sup>

This equation calculates the ground idle fuel flow rate with an accuracy of 99.75%.

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FUNCTIONS FOR CALCULATING GROSS WEIGHT LIMITS FOR TAKEOFF

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for table off orthorna #2 and objects most also be made. The constants for engine limits, take off orthana #2 are

A \* -2,05524782 X 105

n w dissesses x lo 8 - -1.30679001

For take off criteria 42 the constants for transmission limits are:

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C - S coldseld & lore OI X 8088 \$ 10 A

D \* 3. BESTREET X TO E . A SASSIAL X 10

#### 1. CH-47B Operating at 225 RPM

The functions given below will calculate the gross weight limits for take off for the CH-47B helicopter operating at 225 RPM. Each of the functions is of the same basic form with the values of the constants changing depending on which take off criteria is being used. In all cases the Structural Gross Weight Limit of the CH-47B helicopter is 40,000 lbs.

In order to use the functions the following data is needed:

- 1. Temperature (TEMP) in degrees centigrade
- 2. Altitude (ALT) in feet above sea level

That is:

GW (Limit) = f (TEMP, ALT)

The basic equation for GW (Limit) is:

$$GW (Limit) = A(TEMP) + B(ALT) + C(TEMP)(ALT) + D$$

For take off criteria #1 the equation must be used twice, once using the engine limit constants and once using the transmission limit constants. For take off criteria #1 the constants for engine limits are:

 $A = -2.17938816 \times 10^2$ 

 $C = 3.97893076 \times 10^{-3}$ 

B = -1.41074102

 $D = 4.65866338 \times 10^4$ 

For take off criteria #1 the constants for transmission limits are:

A = -4.50966721 X 10

 $C = -3.53499094 \times 10^{-4}$ 

 $B = -4.87621792 \times 10^{-1}$ 

 $D = 4.07345547 \times 10^4$ 

For take off criteria #2 two checks must also be made. The constants for engine limits, take off criteria #2 are:

 $A = -2.05524782 \times 10^2$ 

 $C = 3.59228952 \times 10^{-3}$ 

B = -1.30679001

 $D = 4.32852666 \times 10^4$ 

For take off criteria #2 the constants for transmission limits are:

A = -3.94242868 X 10

 $C = -5.09142679 \times 10^{-4}$ 

 $B = -4.3486141 \times 10^{-1}$ 

 $D = 3.89957397 \times 10^4$ 

Also for take off criteria #3 two checks must be made. The constants for engine limits, take off criteria #3 are:

 $A = -2.44355938 \times 10^2$   $C = 4.44135594 \times 10^{-3}$ 

B = -1.58051027  $D = 5.22083384 \times 10^4$ 

For take off criteria #3 the constants for transmission limits are:

 $A = -5.11538081 \times 10$ 

 $C = -2.98571696 \times 10^{-4}$ 

 $B = -5.47035679 \times 10^{-1}$ 

 $D = 4.56617446 \times 10^4$ 

This equation with the various sets of constants gives results that are 99.73% accurate or better.

for take off critopia #2 two chacks must also be made. The constants

#### 2. CH-47B Operating at 230 RPM

The functions given below will calculate the gross weight limits for take off for the CH-47B helicopter operating at 230 RPM. Each of the functions is of the same basic form with the values of the constants changing depending on which take off criteria is being used. In all cases the Structural Gross Weight Limit of the CH-47B helicopter is 40,000 lbs.

In order to use the functions the following data is needed:

- 1. Temperature (TEMP) in degrees centigrade
- 2. Altitude (ALT) in feet above sea level

That is:

The basic equation for GW (Limit) is:

$$GW (Limit) = A(TEMP) + B(ALT) + C(TEMP)(ALT) + D$$

For take off criteria #1 the equation must be used twice, once using the engine limit constants and once using the transmission limit constants. For take off criteria #1 the constants for engine limits are:

$$A = -2.17639074 \times 10^2$$

$$C = 3.70614778 \times 10^{-3}$$

$$B = -1.39994501$$

$$D = 4.66277666 \times 10^4$$

For take off criteria #1 the constants for transmission limits are:

$$C = -4.86142744 \times 10^{-4}$$

$$B = -4.68419265 \times 10^{-1}$$

$$D = 4.06342041 \times 10^4$$

For take off criteria #2 two checks must also be made. The constants for engine limits, take off criteria #2 are:

$$A = -2.03827135 \times 10^2$$

$$C = 3.29792855 \times 10^{-3}$$

$$B = -1.2926003$$

$$D = 4.320173 \times 10^4$$

For take off criteria #2 the constants for transmission limits are:

$$C = -6.67071632 \times 10^{-4}$$

$$B = -4.13932476 \times 10^{-1}$$

$$D = 3.88251328 \times 10^4$$

Also for take off criteria #3 two checks must be made. The constants for engine limits, take off criteria #3 are:

 $A = -2.4368 \times 10^2$ 

 $C = 4.13300109 \times 10^{-3}$ 

B = -1.56838638

 $D = 5.22495898 \times 10^4$ 

For take off criteria #3 the constants for transmission limits are:

 $A = -4.86859508 \times 10$ 

 $C = -4.32143082 \times 10^{-4}$ 

 $B = -5.27189255 \times 10^{-1}$ 

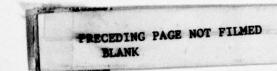
 $D = 4.55598457 \times 10^4$ 

This equation with the various sets of constants gives results that are 99.71% accurate or better.

APPENDIX E

SHORT DESCRIPTION OF CHINOOK (CH-47B) DATA SOURCE





DRDAV-EQA(A)

SUBJECT: Short Description of CH-47B Performance Data Provided to TRADOC Systems Analysis Activity (TRASANA)

#### MFR:

#### 1. References:

- a. United Kingdom CH-47C, Hover-out-of Ground Effect (HOGE), Power Required (Boeing Vertol IOM 8-7442-1-439).
- b. Determination of the Effects of Rotor Blade Compressibility on the Performance of the UH-1F; FTC-TR-65-17.
- c. Airworthiness and Qualification Test (Phase D), CH-47B Helicopter, USAASTA Project No. 66-23.
- d. Operator's Manual, Army Model CH-47B and CH-47C Helicopters, TM55-1520-227-10.
- 2. The performance data presented to TRASANA is the result of combining the helicopter power required, engine power available and engine fuel flow characteristics. The CH-47B power required was calculated from a non-dimensional representation of engine power required (coefficient of power) v.s. gross weight (coefficient of thrust) and true airspeed (advance ratio). The non-dimensional power required was obtained from reference la and lc. All performance in ground effect represents a 10 foot skid height. A temperature dependent correction, based on the method outlined in reference lb, was made to the power required to account for compressibility which could not be accounted for in the non-dimensional representation.
- 3. The T55-L-7C engine power available to the CH-47B (which was used in combination with the power required to find helicopter take-off and speed limits) was used as a function of altitude and temperature, from reference 1c.
- 4. The engine fuel flow at a particular altitude and temperature combination was derived from a representative referred fuel flow as a function of referred engine power. The referred fuel flow curve for the T55-L-7C engine was taken from reference Ic. The calculated fuel flows reflect 5% conservatism. A referred parameter is one which is divided by temperature and pressure ratios in order to represent all atmospheric conditions by one function.
- 5. The never exceed speeds (Vn.e.) were calculated from those shown graphically in reference 1d.
- 6. The Structural Gross Weight limit of the CH-47B is 40000 lbs.

JAMES A. O'MALLEY III Struc & Aeromoch Br